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AUGUST, 1920

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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association*

VOL. III

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No. 8

## ORIGINAL ARTICLES

### AURICULAR FIBRILLATION AND LIFE EXPECTANCY

F. A. WILLIUS, M. D.

*Rochester, Minn.*

Section on Medicine, Mayo Clinic,

The most important and most frequent disorder of cardiac rhythm is that due to fibrillation of the auricles. Its presence in varying

degrees of heart disease renders a prognosis exceedingly difficult at times. Prognosis in heart disease of course cannot be based on one factor but must result from the sum-total of evidence, subjective and objective, and from knowledge gained by adjunct methods.

Cardiac efficiency is determined by the integrity of the myocardium, especially of the ventricular myocardium, as life is dependent directly on the function of these chambers. Other cardiac defects are factors largely modifying the true issue.

#### A

### AURICULAR FIBRILLATION—COMPLETE SERIES

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	5	3	1	2	0	1	1	1					3 yrs. 2 mos.
21-30	37	29	19	10	3	6	4	16x y z		x Tuberculosis y Pneumonia z Influenza	6 days	2 yrs. 4 mos.	1 yr. 2 mos.
31-40	79	58	28	30	9	12	8	29x y		x ? y Pneumonia	13 days	2 yrs. 4½ mos.	11 mos.
41-50	129	104	46	58	29	25	13	37x y z		x Apoplexy y ? z ?	3 days	3 yrs. 3½ mos.	11 mos.
51-60	158	126	63	63	28	30	23	45x y z		x Cerebral Hemorrhage y Pneumonia z Cholangitis	8 days	3 yrs.	10½ mos.
61-70	77	58	35	23	2	15	7	34v w x y z		v Carcinoma of the Tongue w Carcinoma of the Thyroid x Pneumonia y Diabetes z Peritonitis	15 days	2 yrs. 5 mos.	11 mos.
71-80	15	14	11	3	0	0	3	11x y z		x Carcinoma of the Cardia y Carcinoma of the Stomach z Uremia	4 days	2 yrs. 5 mos.	11 mos.
Total	500	392	203	189	71	89	59	173 19	41.3		8 days	2 yrs. 8 mos.	1 yr. 3 mos.
154 cardiac													

\*Presented before the Minnesota State Medical Association, Minneapolis, October 1-3, 1919.

As yet, no method of precision is known for determining cardiac efficiency, but the cardiovascular response to effort is probably the most satisfactory. The obvious objection to this method is the personal equation which materially influences interpretations.

In dealing with an issue as uncertain as life is at best, no physician can conscientiously tell a patient that he will live a specified number of years, months, or days. The object of this study is not to advocate such dogmatism but to corroborate clinical impressions with statistics.

The present analysis is based on 500 cases of auricular fibrillation in which electrocardio-

graphic examinations have been made at the Mayo Clinic. The cases of fibrillation in which electrocardiographic examinations were not made are not included for reasons of group standardization. This series covers a period of four and one-half years. The cases have been grouped for comparative study, and, while the classification is not without certain objections, its employment is quite satisfactory. The statistics are tabulated in Tables 1 to 26.

Group A—Complete series of 500 cases of auricular fibrillation.

Group B—Uncomplicated auricular fibrillation.

### A CONTROL SERIES

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death.		
											Shortest time	Longest time	Average time
11-20	5	4	1	3	2	2	0	0					
21-30	37	26	7	19	4	6	11	5x w		x Tuberculosis of the kidney w ?	15 days	2 yrs. 10½ mos.	1½ yrs.
31-40	79	63	10	53	20	23	13	7x y z		x Intra-abdominal hemorrhage y ? z Pneumonia	2½ mos.	1½ yrs.	7½ mos.
41-50	129	100	29	70	32	22	31	15u v w x y z		u ? v ? w Sarcoma x Nephritis y Apoplexy z ?	10 days	3½ yrs.	10½ mos.
51-60	158	130	53	77	32	38	29	31r, s, w t, x u, y v, z		r Carcinoma of the Stomach s Pneumonia w ? t Apoplexy x ? u ? y Pneumonia v ? z Killed	4 days	3 yrs. 5 mos.	9 mos.
61-70	77	63	42	22	14	12	19	18r s t u v w x y z		r Gallbladder Disease s Carcinoma of the Liver t Carcinoma of the Rectum u Carcinoma of the Pancreas v Carcinoma w Abdominal Carcinoma x Abscess of Lung y ? z ?	9 days	1 yr. 2 mos.	5½ mos.
71-80	15	13	10	3	2	4	2	5y z		y ? z Apoplexy	4 mos.	8 mos.	6 mos.
Total	500	399	152	247	106	107	105	81 31	13.6		1 mo. 9 days	2 yrs. 2 mos.	9 mos.
										50 cardiac			



Group B—Auricular fibrillation with premature ventricular contractions.

Group B<sub>1</sub>—Auricular fibrillation with arborization block.

Group B<sub>2</sub>—Auricular fibrillation with arborization block and premature ventricular contractions.

The groups complicated by arborization (impaired intraventricular conduction) include only those cases in which the ventricular conduction system was diffusely involved, as expressed by the presence of abnormal ventricular complexes in all three derivations of the electrocardiogram. In a previous publication I have emphasized the gravity of this disorder unattended by abnormalities.

Group C comprises chronic valvular diseases, grouped with reference to the type of lesion. The criteria adopted for the diagnosis of mitral stenosis in the presence of auricular fibrillation are those laid down by Mackenzie, namely, the

presence of a diminuendo apical murmur, diastolic in time.

Group C—Auricular fibrillation in mitral insufficiency.

Group C<sub>1</sub>—Auricular fibrillation in mitral stenosis.

Group C<sub>2</sub>—Auricular fibrillation in double mitral lesion (insufficiency and stenosis).

Group C<sub>3</sub>—Auricular fibrillation in aortic insufficiency.

Group D includes diseases of the myocardium, chronic myocarditis in the strict sense of a chronic inflammatory process, and myocardial degenerations secondary to other conditions.

Group D—Auricular fibrillation in chronic myocarditis.

Group D<sub>1</sub>—Auricular fibrillation in myocardial disease secondary to hypertension with and without clinical nephritis.

Group D<sub>2</sub>—Auricular fibrillation in myocardial disease secondary to exophthalmic goiter (hyperplastic toxic).

## B UNCOMPLICATED AURICULAR FIBRILLATION.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	4	2	0	1	1	1	0	0					
21-30	27	22	13	9	3	5	3	11x y z		x Tuberculosis y Pneumonia z Influenza	6 days	2 yrs. 4½ mos.	9 mos.
31-40	57	39	18	21	5	9	6	19y z		y ? z Pneumonia	13 days	2 yrs. 4½ mos.	11½ mos.
41-50	101	82	34	48	23	20	11	28y z		y ? z Apoplexy	5 days	3 yrs. 3½ mos.	11 mos.
51-60	118	89	39	50	22	25	13	29x y z		x Cerebral Hemorrhage y Pneumonia z Cholangitis	3 days	3 yrs.	13 mos.
61-70	50	39	26	13	3	13	2	21w x y z		w Carcinoma of the Tongue x Pneumonia y Diabetes z Peritonitis	14 days	2 yrs. 5 mos.	13 mos.
71-80	10	9	7	2	0	0	3	6y z		y Carcinoma of the Cardia z Carcinoma of the Stomach	4 days	1 yr.	4 mos.
Total	367	282	137	144	57	73	38	114 16 98 cardiac	36.9		7½ days	2 yrs. 5 mos.	10 mos.

Group D—Auricular fibrillation in myocardial disease secondary to thyrotoxic adenomas (non-hyperplastic toxic).

Control series to all groups are compiled, corresponding in total number, occurrence by decades and sex. The patients comprising this series all received electrocardiographic examinations. An attempt was made to make the control series a just comparison; it seemed best, therefore, to exclude the graver forms of heart disease, namely angina pectoris, arborization block, and lesions of the auriculoventricular bundle, aortic disease, and auricular flutter.

Letters were sent to all patients question-

ing them relative to their cardiac status, and in event of death, requesting the relatives or friends to forward the date and exact cause of death. A third letter was sent in some instances.

A glance at these statistics at once reveals the increased mortality attending heart disease complicated by auricular fibrillation. In most instances the death rate was doubled and trebled. The arrhythmia per se is, of course, not the determining factor.

#### CONCLUSIONS

The mortality attending auricular fibrillation doubles and in some groups trebles that

### B UNCOMPLICATED SINUS RYTHM—CONTROL SERIES

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	4	3	1	2	1	2	0	0					
21-30	27	20	4	16	4	5	9	2			15 days	2 yrs.	1 yr. 5½ mos.
31-40	57	47	5	42	15	17	8	7v w x y z		v ? w Intrabdominal Hemorrhage x Pneumonia y Pneumonia z ?	3½ mos.	1 yr. 3 mos.	9½ mos.
41-50	101	78	20	58	28	14	24	12v w x y z		v ? w ? x Sarcoma y Nephritis z Apoplexy	10 days	2 yrs.	7 mos.
51-60	118	98	38	60	24	27	24	23v w x y z		v Carcinoma of the Stomach w Pneumonia x Apoplexy y ? z ?	4 days	1 yr. 3 mos.	6½ mos.
61-70	50	43	29	14	7	11	10	15s t u v w x y z		s Gallbladder Disease t Carcinoma of the Rectum u Carcinoma of the Liver v Carcinoma of the Pancreas w Carcinoma x Abdominal Carcinoma y Lung Abscess z ?	9 days	1 yr. 2 mos.	5½ mos.
71-80	10	9	7	2	1	3	1	4y z		y ? z Apoplexy	4 mos.	8 mos.	6 mos.
Total	367	298	104	194	80	79	76	63 25	16.2		1 mo. 9 days	1½ yr.	8½ mos.
								38	cardiac				

occurring in similar types of heart disease not complicated by this arrhythmia. It is logical to conclude, therefore, that patients suffering from heart disease in whom auricular fibrillation has not occurred have a greater life expectancy.

**B-1**

### AURICULAR FIBRILLATION WITH PREMATURE VENTRICULAR CONTRACTIONS.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	1	1	0	1	0	0	0	1					3 yrs.
21-30	7	5	4	1	0	1	1	3			2 mos.	2 yrs.	2 yrs.
31-40	17	15	8	7	1	2	5	7			5½ mos.	3½ yrs.	1½ yrs.
41-50	20	14	6	8	4	4	2	4			10 days	1½ yrs.	6½ mos.
51-60	26	23	15	8	3	6	8	6			17 days	1 yr. 3 mos.	6 mos.
61-70	16	9	4	5	0	2	1	6			6 days	1 yr. 3 mos.	9 mos.
71-80	2	2	1	1	0	0	0	2			1 mo.	1 yr. 9 mos.	11 mos.
Total	89	69	38	31	8	15	17	29	42.0		1½ mos.	1 yr. 10½ mos.	1½ yrs.

## B-1

### PREMATURE VENTRICULAR CONTRACTIONS—CONTROL SERIES

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	1	0	0	0	0	0	0	0					
21-30	7	5	1	4	0	3	2	2					
31-40	17	14	4	10	2	5	5	2x		x Carcinoma			28 days
41-50	20	17	9	8	2	7	3	5x y		x Influenza y Peritonitis	1½ mos.	2 yrs. 10½ mos.	1 yr. 8 mos.
51-60	26	19	9	10	3	8	5	3x y		x Indeterminate y Carcinoma			8½ mos.
61-70	16	11	9	2	1	3	2	5			5 mos.	2 yrs. 4 mos.	1 yr. 2 mos.
71-80	2	2	2	0	0	2	0	0					
Total	89	68	34	34	8	28	17	15 5	15.9		3 mos.	2 yrs. 7 mos.	10 mos.
								10 cardiac					

## B-1

## AURICULAR FIBRILLATION WITH ARBORIZATION BLOCK.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	1	1	1	0	0	0	0	1					11½ mos.
31-40	5	3	3	0	0	0	1	2			3½ mos.	5 mos.	4½ mos.
41-50	7	6	4	2	2	1	0	3			2½ mos.	2 yrs.	1 yr.
51-60	9	8	5	3	0	2	0	6			2 mos.	1 yr. 10 mos.	9 mos.
61-70	9	8	5	3	0	1	3	4			23 days	1 yr. 4 mos.	8 mos.
71-80	2	2	2	0	0	0	0	2x		x Pneumonia			7 mos.
Total	33	28	20	8	2	4	4	18	63.4		2 mos.	1 yr. 5 mos.	9 mos.
										1			
										17 cardiac			

## B-2

## ARBORIZATION BLOCK—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	1	1	1	0	0	1	0	0					
31-40	5	3	2	1	0	1	0	2x		x Pneumonia			16 days
41-50	7	4	2	2	1	0	1	2x		x ?			6 mos.
51-60	9	9	5	4	2	1	1	5x		x ?	1 mo.	4 mos.	9½ mos.
61-70	9	8	4	4	0	2	0	6			1½ mos.	1 yr.	6 mos.
71-80	2	2	1	1	1	0	0	1					3 mos.
Total	33	27	15	12	4	5	2	16	54.2		1 mo.	7 mos.	5 mos.
										3			
										13 cardiac			

## REFERENCES

1. Mackenzie, J.: Diseases of the heart. London, Frowde, 222-223, 1914.
2. Willius, F. A.: Arborization block. Arch. Int. Med., xxiii, 431-440, April, 1919.

## DISCUSSION

DR. S. MARX WHITE, Minneapolis: Mr. Chairman, Ladies and Gentlemen: This study of Dr. Willius is one of the most interesting that I have seen and I covet an opportunity to study more fully the tables which he has given. Naturally, in a hasty re-

## B-3

## AURICULAR FIBRILLATION WITH ARBORIZATION BLOCK AND PREMATURE VENTRICULAR CONTRACTIONS.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	2	1	1	0	0	0	0	1x		x Influenza			
41-50	1	1	0	1	0	0	0	1					2 mos.
51-60	5	4	3	1	1	0	0	3			2½ mos.	1 yr.	8½ mos.
61-70	2	2	1	1	0	0	0	2			1½ mos.	7 mos.	4 mos.
71-80	1	1	1	0	0	0	0	1					1 yr.
Total	11	9	6	3	1	0	0	8	87.5		2 mos.	1 yr.	6 mos.
								1					
								7	cardiac				

## B-3

## ARBORIZATION BLOCK WITH PREMATURE VENTRICULAR CONTRACTIONS—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	2	1	1	0	0	0	0	1					2½ mos.
41-50	1	1	1	0	0	0	0	1					5 mos.
51-60	5	4	4	0	0	0	0	4					3 mos.
61-70	2	2	2	0	0	1	0	1					10 mos.
71-80	1	1	0	1	0	0	0	1x		x Carcinoma			
Total	11	9	8	1	0	1	0	8	87.5				5 mos.
								1					
								7	cardiac				

view of this kind he can touch only the peaks and give us only a sketch, but it is evident that these tables bring out a number of points which are of very great importance in the end results, not only in auricular fibrillation, but in allied condition. Dr. Willis brings out one point which I think deserves emphasis, and that is the liability to better management in cases with irregularity. I think that at the present time it has not become widespread among the profession to recognize the type of irregularity present in a cardiac case, but it is possible with careful study in

a great majority of instances for the practitioner to recognize these irregularities without the aid of the electrocardiograph. Our own experience has told us that the study with fine graphic methods gives us a very much better insight into cases than when studied clinically. The study of such cases by means of the electrocardiograph has taught us to recognize without the electrocardiograph, and even without the polygraph, many cases, particularly of auricular fibrillation. Since that is the most frequent serious irregularity and since the extra systole can be in a



## C

## AURICULAR FIBRILLATION IN MITRAL INSUFFICIENCY.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	2	1	0	1	0	0	1	0					
21-30	12	7	5	2	0	3	0	4			2 mos.	2 yrs.	1 yr. 2 mos.
31-40	18	13	11	2	1	2	3	7			1 mo.	1 yr. 10 mos.	7 mos.
41-50	22	17	12	5	3	4	1	9			10 days	2 yrs. 7 mos.	1 yr. 3 mos.
51-60	11	8	5	3	2	2	1	3			1 mo.	1 yr. 1 mo.	8 mos.
61-70	6	5	3	2	0	1	1	3			14 days	1 yr. 1 mo.	7 mos.
71-80	1	1	1	0	0	0	0	1					1 yr. 2 mos.
Total	72	52	37	15	6	12	7	27	51.9		1 mo.	1 yr. 8 mos.	11 mos.

## C

## MITRAL INSUFFICIENCY—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	2	1	1	0	0	1	0	0					
21-30	12	10	4	6	1	4	5	0					
31-40	18	13	3	10	2	6	2	3x		x Pneumonia	9 mos.	1 yr.	11 mos.
41-50	22	17	11	6	2	3	5	7x y		x ? y Nephritis	2 mos.	2 yrs.	9 mos.
51-60	11	10	6	4	2	2	2	4			1 mo.	½ yr.	3½ mos.
61-70	6	5	4	1	0	1	1	3			2 mos.	1 yr. 1 mo.	1 yr.
71-80	1	1	1	0	0	0	0	1					
Total	72	57	30	27	7	17	15	18 3	27.8		3½ mos.	1 yr. 1½ mos.	9 mos.
15 cardiac													

great majority of instances recognized, it is well for everyone of us to apply ourselves to the problem long enough to be able to recognize it. The other features

which are associated with the auricular fibrillation such as arborization block, etc., are states which require study with the electrocardiograph to bring out.



## C-1

## AURICULAR FIBRILLATION WITH MITRAL STENOSIS.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	4	3	1	2	0	0	1	2			1 mo.	2 yrs. 4 mos.	9 mos.
31-40	10	5	2	3	0	2	1	2			9 mos.	10½ mos.	10 mos.
41-50	7	5	1	4	1	1	1	2			5 mos.	10½ mos.	7½ mos.
51-60	5	3	1	2	0	1	1	1					
61-70	1	1	1	0	0	0	0	1					½ mo.
Total	27	17	6	11	1	4	4	8	47.1		5 mos.	1 yr. 4 mos.	7 mos.

## C-1

## MITRAL STENOSIS—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	4	2	1	1	0	0	1	1					2 yrs. 10 mos.
31-40	10	6	4	2	0	4	0	2x	x ?				1 yr. 4 mos.
41-50	7	6	1	5	1	2	1	2x	x Pneumonia				4 mos.
51-60	5	5	1	4	1	2	1	1					1½ mos.
61-70	1	1	0	1	0	0	1						
Total	27	20	7	13	2	8	4	6	22.2				1 yr. 2 mos.
										4 cardiac			

The arborization block can be emphasized only at present by the electrocardiograph and that emphasizes the need for the wider use of these careful studies in cardiac cases. Its greater use places in the hands of the profession an opportunity to get these data and since also, the appearance of auricular fibrillation is the one indication,—I say the one indication that I know, at least,—for the administration of digitalis, I think it is particularly important for the practitioner to learn to recognize its presence even though he may not be able always to recognize certain other complicating factors that Dr. Willius has brought out.

DR. E. L. TOUHY, Duluth: I had the pleasure of meeting Mackenzie in 1912 and hearing some of his lectures in London. It was evident that he did not then appreciate as much as is now appreciated that these irregularities sometimes overlap, and having made a diagnosis of auricular fibrillation or extra systole does not mean that all the case is settled. He has studied these cases for many years and his particular point was to find out how long people were going to live, but on going over his records he found where he had made mistakes for many years and others making them right along, and while we as a profession were interested in the diagnosis, the pa-

## C-2

## AURICULAR FIBRILLATION WITH DOUBLE MITRAL LESION.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	3	2	1	1	0	1	0	1					3 yrs. 10½ mos.
21-30	6	5	5	0	1	1	1	2			7 mos.	1 yr.	9 mos.
31-40	14	10	4	6	0	2	2	6			3 mos.	1 yr. 10 mos.	10½ mos.
41-50	9	7	2	5	1	1	2	3			1 mo.	3 yrs. 2 mos.	1 yr. 9 mos.
51-60	6	3	1	2	0	1	0	2x		x Cholangitis			3 yrs.
61-70	2	2	1	1	0	0	0	2			7 mos.	9 mos.	7½ mos.
Total	40	29	14	15	2	6	5	16	53.4		4½ mos.	1 yr. 8 mos.	1 yr. 10 mos.
										1			
										15 cardiac			

## C-2

## DOUBLE MITRAL LESION—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
11-20	3	1	1	0	0	0	0	1					2 mos.
21-30	6	5	1	4	1	1	2	1x		x Influenza			
31-40	14	12	1	11	1	3	5	3x		x Pneumonia	5 mos.	1 yr.	8 mos.
41-50	9	6	2	4	1	1	0	4			1½ mos.	2 yrs. 7½ mos.	10½ mos.
51-60	6	5	3	2	1	1	0	3x y		x ? y ?			1 yr. 3 mos.
61-70	2	1	1	0	0	0	0	1					1 yr.
Total	40	30	9	21	4	6	7	13	34.6		3 mos.	1 yr. 9½ mos.	11 mos.
										4			
										9 cardiac			

tient was much more interested in the prognosis. Like the man who said he would give ten thousand dollars to know where he was going to die. A friend asked him why he wished to know and he said "Because if I did know I never would go near the place." (Laughter.)

DR. L. A. NIPPERT, Minneapolis: Mr. Chairman, Gentlemen: I think the insistence of Dr. White that these things can be diagnosed by clinical methods is very timely. In a regular practice you do not always have access to an electrocardiograph, and even if you have, you have to have an expert to interpret the

## C-3

## AURICULAR FIBRILLATION WITH AORTIC INSUFFICIENCY.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	2	2	2	0	0	0	0	2x		x Influenza			10 mos.
41-50	5	3	1	2	0	3	0	0					
51-60	4	3	3	0	1	0	1	1					9 mos.
61-70	2	2	2	0	0	0	0	2			$\frac{1}{4}$ mo.	$\frac{3}{4}$ mo.	$\frac{1}{2}$ mo.
Total	13	10	8	2	1	3	1	5	44.4		$\frac{1}{4}$ mo.	$\frac{3}{4}$ mo.	6 $\frac{1}{2}$ mos.
										1			
										4 cardiac			

## C-3

## AORTIC INSUFFICIENCY—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	2	1	1	0	0	0	0	1					6 days
41-50	5	5	3	2	1	0	1	3x		x ?	1 yr. 1 mo.	1 yr. 8 mos.	1 yr. 5 mos.
51-60	4	2	2	0	0	0	0	2x		x ?			1 mo.
61-70	2	2	2	0	0	0	0	2x		x Peritonitis			6 mos.
Total	13	10	8	2	1	0	1	8	71.4		1 yr. 1 mo.	1 yr. 8 mos.	6 mos.
										3			
										5 cardiac			

findings. But we have our fingers and hands, our ears and our eyes, but sometimes—as the scripture says—we have eyes and see not, ears and hear not, and many times we do not use the natural things we have. I think, however, that all these apparatuses have given us a great insight into the workings of the different heart muscles, of which we had no idea before. I think the combination of the two, in obscure cases, helps us find the cause and give a correct diagnosis and proper treatment.

DR. S. P. REES, Minneapolis: I hesitate to voice one thought that has come to me while hearing the paper read, but it is in regard to taking care of heart conditions before auricular fibrillation comes on. This paper is very interesting because it attempts to show the relationship between auricular fibrillation and the continuation of health and life. The papers

that we have had during the last few years have contained the things with just the diagnosis, and then called attention to the digitalis. These tables have seemed to emphasize what, at a meeting of this kind where there are many general practitioners, should get firmly fixed in your mind. The first thought, that auricular fibrillation is an incurable condition; the second that it is a late complication or development not in every, but in very many chronic heart ailments, where the heart power is worn out. It is important that we pay very close attention to the very first infringement on the integrity of the heart. I want to speak particularly of the effect of valvular leakage. It is in the late stages of these valvular defects that we most assuredly get auricular fibrillation, and I want to emphasize this because that is the heart lesion that we can all recognize. It is quite

**D**  
**AURICULAR FIBRILLATION IN CHRONIC MYOCARDITIS.**

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	1	1	1	0	0	0	1	0					
31-40	11	8	5	3	0	4	1	3x		x ?	2 yrs. 2 mos.	2 yrs. 4 mos.	2 yrs. 3 mos.
41-50	13	10	9	1	3	3	1	3x		x ?	3 mos.	1 yr.	10 mos.
51-60	31	25	20	5	5	7	3	10			4½ mos.	2 yrs. 9 mos.	11 mos.
61-70	13	9	4	5	0	5	1	3			1 yr. 1 mo.	1½ yrs.	1 yr. 3 mos.
71-80	12	10	10	0	0	0	3	7v w x y z		v Carcinoma of the Cardia w Pneumonia x Carcinoma of the Stomach y Uremia z Uremia	1 mo.	9 mos.	5 mos.
Total	81	63	49	14	8	19	10	26 7 33.9			9 mos.	1 yr. 8 mos.	1 yr. 2 mos.
19 cardiac													

**D**  
**CHRONIC MYOCARDITIS—CONTROL SERIES.**

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
21-30	1	0	0	0	0	0	0	0					
31-40	11	8	4	4	0	2	1	5x		x Carcinoma	6 mos.	2 yrs.	1 yr. 4½ mos.
41-50	13	10	5	5	0	5	2	3			2 mos.	2 yrs. 7½ mos.	1 yr.
51-60	31	26	18	8	4	6	2	14x y		x Carcinoma y Peritonitis	7 days	1 yr. 8½ mos.	5 mos.
61-70	13	11	7	4	1	3	3	4x		x Carcinoma	1 mo.	3 mos.	1½ mos.
71-80	12	11	10	1	1	2	2	6x y		x ? y Pneumonia	3 mos.	6½ mos.	4½ mos.
Total	81	66	44	22	6	18	10	32 6 43.3			2½ mos.	1 yr. 5 mos.	8 mos.
26 cardiac													

easy when there is a murmur. In the literature there has been a very marked tendency to minimize

the effect of valvular leakage. That may be true, but I have failed to reach this conclusion from personal



## D-2

## AURICULAR FIBRILLATION IN MYOCARDIAL DISEASE SECONDARY TO EXOPHTHALMIC GOITER.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Deaths after thyroidectomy	Time interval from examination until death		
												Shortest time	Longest time	Average time
21-30	11	10	4	6	1	2	1	6x		x Tuberculosis	0	7 days	2 yrs.	7 mos.
31-40	19	17	2	15	5	2	1	9x y		x ? y Pneumonia	3	2 mos.	3½ yrs.	11 mos.
41-50	40	33	9	24	11	7	4	11x		x Apoplexy	3	5 days	3 yrs. 3 mos.	7½ mos.
51-60	24	22	10	12	9	4	4	5x		x Apoplexy	0	3½ mos.	1 yr. 9 mos	9 mos.
61-70	3	3	3	0	0	1	0	2x		x Carcinoma of the Thyroid	0			
Total	97	85	28	57	26	16	10	33 6	34.2		6	1½ mos.	2 yrs. 7½ mos.	8½ mos.
27 cardiac														

## D-2

## MYOCARDIAL DISEASE SECONDARY TO EXOPHTHALMIC GOITER—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac		Time interval from examination until death		
												Shortest time	Longest time	Average time
21-30	11	8	2	6	0	4	2	2				½ mo.	5 mos.	3 mos.
31-40	19	16	1	15	8	2	4	2x		x Pneumonia				1 yr. 3 mos.
41-50	40	35	6	29	13	14	8	6y z		y ? z Tetany		10 days	1 yr. 10 mos.	2 yrs. 7 mos.
51-60	24	23	7	16	12	7	4	4				½ mo.	10½ mos.	4 mos.
61-70	3	3	1	2	0	0	0	3				1 mo.	11 mos.	4 mos.
Total	97	85	17	68	33	27	18	17 3	17.1			½ mo.	1 yr.	11½ mos.
14 cardiac														

observation of a large number of young people whom I have followed for 15 or 16 years and whom I began to see when they were little children. I have followed them up and while it is possible that we may add to the injury to the heart muscles during these years, and while I cannot say how much the heart muscle was injured originally, I know that these young

adults have taken good care of themselves, but in spite of this, as the years go on I find they are beginning to lose out. I should like very much to know how closely these cases were followed by the writer,—whether they were just seen at the clinic for a short period and then allowed to go home, and whether is it not known how sensibly they lived or



## D-3

## AURICULAR FIBRILLATION IN MYOCARDIAL DISEASE SECONDARY TO THYROTOXIC ADENOMAS.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Deaths after thyroidectomy	Time interval from examination until death		
												Shortest time	Longest time	Average time
31-40	3	2	0	2	1	0	1	0			0			
41-50	18	16	4	12	8	4	2	2			0	3 days	1 yr. 4 mos.	8 mos.
51-60	39	33	6	27	6	6	10	11			0	2½ mos.	2 yrs.	10 mos.
61-70	10	8	3	5	1	2	1	4			0	5 mos.	2 yrs. 3 mos.	1 yr. 1 mo.
71-80	1	1	0	1	0	0	0	1			0			4 days
Total	71	60	13	47	16	12	14	18	30			4 mos.	1 yr. 10 mos.	10 mos.

## D-3

## MYOCARDIAL DISEASE SECONDARY TO THYROTOXIC ADENOMAS—CONTROL SERIES.

Decade	Total	Patients heard from up to present time	Males	Females	Improved	Worse	Unchanged	Deaths	Per cent of cardiac deaths	Deaths other than cardiac	Time interval from examination until death		
											Shortest time	Longest time	Average time
31-40	3	2	0	2	2	0	0	0					
41-50	18	16	0	16	10	2	4	0					
51-60	39	35	4	31	8	9	10	8 w x y z		v Indeterminate w Carcinoma x Pneumonia y Killed z ?	2 yrs. 8 mos.	3 yrs. 7 mos.	3 yrs.
61-70	10	8	3	5	1	2	3	2			13 days	9 mos.	4½ mos.
71-80	1	1	0	1	0	0	0	1x		x Cancer			
Total	71	62	7	55	21	13	17	11 6	8.9		1 yr. 4 mos.	2 yrs. 2 mos.	1 yr. 8 mos.
5 cardiac													

how good care they took of themselves. The tables show the gravity of this condition which is a late development in almost any heart trouble.

DR. J. W. BELL, Minneapolis: Mr. Chairman, Gentlemen: I only want to emphasize that in the last analysis, no matter what the issue, we must keep in mind definitely the condition of the myocardium. Let us have that constantly in mind, whether the

heart is erratic, whether it is regular or irregular. Let us have that distinctly in mind, for in the last analysis it means how much service there is in the heart muscle.

DR. C. N. HENSEL, St. Paul: Mr. Chairman, Ladies and Gentlemen: I just want to say two things: the longevity in the heart muscle depends upon two things,—the integrity of the muscles and how the

patient takes care of it. You cannot make a blanket statement as to the disease alone without knowing how the patient will take care of it. Apparently from the tables of Dr. Willius it means heart muscle disease and innervation disease. Consequently, I want to leave the thought with you that those of you out in the country, far away from the electrocardiograph, can make the diagnosis of auricular fibrillation even there and nobody should fail. If you will count the heart over the apex and have an assistant count the pulse at the wrist for a full minute and you find a discrepancy over the beat of the heart at the wrist, having 120 over the heart and 70 at the wrist, you have auricular fibrillation and that means digitalis and if that is given the condition will improve in every instance.

DR. M. M. GHENT, St. Paul: Mr. Chairman, Gentlemen: From the standpoint of the surgeon, I have found that one little point has helped me out more than anything else in deciding whether I can afford to operate or not. If the patient can walk up one flight of stairs without difficulty I feel that I can operate without risk, and that is the big thing so far as the heart is concerned.

DR. F. A. WILLIUS (closing): Mr Chairman, Gentlemen of the Association: I am very glad that the question of the electrocardiograph was brought up. I think that practically all cases of auricular fibrillation can be diagnosed clinically, but there is one condition in which extra systoles are so arranged that they simulate auricular fibrillation. The electrocardiograph must be used as an adjunct method of examination.

As to Dr. Rees' question: Of course, many of the patients were at the Clinic only for a day or so. In the greater cases we are more closely associated with the patients as they remain longer and we have a better opportunity to follow up histories. There is a certain group in which we are fortunate enough to secure data from the home physician, and in at least one-half we are forced to be guided by what the patient writes. I think, however, that the tables have a distinct value because they represent a large series and the minor defects are overbalanced.

As to Dr. Hensel's statement regarding the pulse deficit in diagnosis: We have observed a great many cases, and probably one-third do not have a pulse deficit, especially those with slow rates. In these the diagnosis must be made by the variations in amplitude of the individual beats and the total arrhythmia. In my experience these factors have been more reliable than the pulse deficit.



## RECENT STUDIES UPON THE THERAPEUTIC APPLICATION OF BENZYL ALCOHOL BENZYL BENZOATE AND SOME HOMOLOGOUS COMPOUNDS\*

By ARTHUR D. HIRSCHFELDER, M. D.,  
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We accept most of our drugs ready made by the plants, as though the plant which has not even a nerve cell had more brains than a chemist—as though the alkaloids that are formed as secretions by the plants were necessarily the ideal substances for the cure of disease. Now the plant alkaloids have big molecules which probably contain many groups that are not only unnecessary to produce the desired medicinal effect in the body, but which actually render the substance more toxic than is necessary to accomplish the purpose.

It was therefore a great step in advance when David Macht of Johns Hopkins, in 1917 attempted to determine what part of the papaverin molecule was responsible for its action. He noticed that the papaverin molecule was composed of two parts, an isoquinolin nucleus and a benzyl nucleus. The benzyl group is not the same as benzol ( $C_6H_6$ ) but is  $C_6H_5CH_2$ , with one free linkage. He found that the benzyl part, and not the isoquinolin part of the papaverin molecule, carried the characteristic actions of papaverin.

Pal had shown, and Macht had confirmed the observation, that papaverin has definite local anesthetic properties. Macht was able to obtain this local anesthetic action with benzyl alcohol alone—a substance far less toxic. Pal had shown that papaverine causes relaxation of the smooth muscles in the clinical conditions in which they are in spasm; and Macht has been able to obtain the same results, not only with papaverin, but with the esters of benzyl alcohol, particularly with benzyl benzoate. The great advantage of these drugs is that in the body, there are oxidized to benzoic acid, that they are thus almost devoid of toxicity, and that they cannot be habit forming.

Macht claims that benzyl alcohol is an excel-

\*Presented before the Southern Minnesota Medical Association, Dec., 1919, Mankato.

lent local anesthetic and reports a large number of surgical operations that have been performed with it, using a 2 per cent solution.

At the University of Minnesota, we have repeated his observations and have found that it usually produces local anesthesia, but sometimes this anesthesia is very incomplete, and also that it frequently causes definite irritation in the subcutaneous tissues, and that injections are often followed by soreness and edema.

With the collaboration of Mr. Lundholm and Mr. Norrgaard, senior students, I have therefore tested a considerable number of substances which are chemically similar to benzyl-alcohol, in order to determine which is the best possible local anesthetic of this series. We have found that of the series thus far tested, the alcohol of the salicylic radical, that is the hydroxy benzyl alcohol, known as saligenin, which is  $\text{C}_6\text{H}_5\text{OH}-\text{CH}_2-\text{OH}$ , is by far the best. This substance is at least twice as strong a local anesthetic as benzyl alcohol, and in over thirty injections has never given any subcutaneous edema or irritation. Its toxicity is about thirty times less than that of novocaine. Until the past two weeks we have had only very small quantities of the substance at our disposal, so that we have used it in only 6 tonsillectomies performed by Drs. Clark and Camp, one tonsil being removed under novocaine anesthesia, the opposite tonsil under saligenin. The anesthesia has always been equal on both sides. In two others, done by Dr. Kenneth Phelps, the anesthesia on the saligenin side was about as good as the one on the opposite side where cocaine was used, but after the operation was over it did not last as long. Saligenin is like novocaine, and not like cocaine, in the fact that it anesthetizes on injection but does not anesthetize the mucous membranes.\*\* Pure benzyl alcohol does this however, as Macht has shown.

In one operation for the removal of a sebaceous cyst at the angle of the jaw, the anesthesia was perfect for forty minutes, and then passed off. Saligenin is also better than benzyl alcohol in its keeping qualities, because it is a solid crystalline compound which keeps

unchanged for years, while benzyl alcohol is a liquid that oxidizes spontaneously and rapidly to benzaldehyde.

Moreover, both benzyl alcohol and saligenin are quite good antiseptics and in one-half per cent strength inhibit the growth of streptococci. In view of the fact that saligenin is so non-irritating to the tissues, it is probable that this action can be put to use in the treatment of conjunctivitis in surgical irrigations and dressings, and in similar conditions. The subject is now being studied under a grant from the Interdepartmental Social Hygiene Board.

Both benzyl alcohol and saligenin are vasodilators, so that adrenalin must be added to them when constriction of the arteries is desired. As regards the use of benzyl benzoate, we have had the same results as Macht, namely that both in the laboratory and in the clinic it causes relaxation of smooth muscle and gives relief in many cases of diseases in which the symptoms are due to smooth muscle spasm.

We found that the alcoholic solutions that were on the market, and in fact any mixture containing alcohol, has a very unpleasant, bitter, burning taste, but we have been able to disguise this entirely by using a new mixture, made up as follows: Pure Benzyl benzoate 10 parts, emulsion of acacia 5, Elixir eriodictyi aromaticum (National Formulary) 35,—using doses of 1 teaspoonful of the mixture, which are somewhat larger than the doses used by Macht. This is a pleasant mixture to take and will be taken by persons who refuse to take the alcoholic solutions, or any mixture containing it.

We have been able to secure relief of symptoms in a considerable number of cases of conditions caused by spasm of smooth muscle,—cardiospasm, pylorospasm, pain in gastric ulcer and hyperacidity, and we have also seen relief from aspartic constipation. The relief occurs within half an hour after taking and lasts.

We have also been able to verify Macht's observation that benzyl benzoate brings about relief in many, but by no means all, cases of bronchial asthma, just as is true of atropin or other drugs that inhibit the vagus. Still more striking results have been obtained in the treatment of dysmenorrhoea with the cooperation of Doctor Litzenberg, who will tell you in more

\*\*Since the article was written it has been found that 10 per cent solutions of saligenin anesthetize mucous membranes, so that it can be used in cystoscopy.

detail of the results which he has obtained. About eighty per cent of the cases have had relief from pain after one to three doses. Here the great advantage of the drug lies, in the fact that they are neither toxic nor habit forming.

We are hoping soon to have enough of the corresponding products of saligenin on hand to try them out clinically, and determine how they compare with benzyl benzoate as antispasmodics—and also how saligenin compounds will act in cases of arthritis. The field seems a promising one, and we are hoping for further results.

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### BLOOD TRANSFUSION: METHODS AND INDICATIONS, WITH SPECIAL REFERENCE TO THE SUSTAINING VALUE OF REPEATED BLOOD TRANSFUSIONS IN PERNICIOUS ANEMIA\*

BY FREDERICK H. K. SCHAAF, M. D.

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The history of blood transfusion dates back to almost the very beginning of medical science. It was known to the physicians of old Egypt and to the priests of Apollo in Greece, and we have authentic reports of more or less successful attempts at transfusion as early as 1492. But the credit of establishing the transfusion of blood as a standard therapeutic procedure belongs to the physicians of the present century.

Today we recognize three standard methods, namely: ?

1. The surgical, or the artery-to-vein method, as perfected by Crile and Bernheim.

2. The syringe method, as advocated by von Ziemssen and perfected by Lindemann, Unger, Bernheim, and others.

3. The sodium citrate method, as advocated by Hustin, Lewisohn, Weil, and Agote in 1915.

Crile's direct method has been practically abandoned since the other methods have made the obliteration of vessels unnecessary. The syringe method, or any of its modifications, is still used by many physicians, but can be performed only in an operating-room and requires skilled assistance. While this method may be superior to the citrate method in a few points, it has too many disadvantages to be the method of choice. It is excelled by the sodium citrate method which has one advantage that practically offsets all points of superiority in other methods, i.e., its technic is so simple that it may be performed at any place or at any time.

In his recent article in the *Journal of the A. M. A.*, Lindemann very unjustly ascribes to this method some of the deaths reported, but at the same time blames imperfect grouping for the production of chills and fever in 33 per cent of his first 150 cases. Wrong grouping occurred in but one of my cases; and the first 35 c. c. of blood injected produced such severe backache, dyspnoea, cyanosis, and loss of sphincter control that I can hardly believe wrong grouping is responsible for any of the ordinary reactions following transfusion. Nor do I think it advisable or necessary to transfuse as much as 1800 c. c. because of possible strain of the right heart of the patient and danger to the donor. Definite over-transfusion occurred upon two occasions in the same case: once after 750 c. c. and another time after 850 c. c. of blood had been given. The "cough symptom" recently described by Unger appeared while the patient was on the table, and continued for about two days. Definite reaction occurred in about 39 per cent of my first 100 cases, but not a single death occurred that could have been caused by the transfusion. Users of the syringe method admit reactions in from 10 to 30 per cent of the cases, and consequently at least 50 per cent of the reactions must be due to faults existing in both of these two methods. At the Mayo Clinic,

\*Read before the Minnesota State Medical Meeting, Oct. 1, 2 and 3, 1919, Minneapolis, Minn.



where the citrate method is used exclusively, reactions seem to have been reduced by starving both the patient and the donor for at least six hours preceding the transfusion. This may explain to us the cases where using the same donor and the same amount of citrated blood, the patient would have a severe reaction one time and not another. Novys and De Kruif's explanation that blood outside of the body develops toxic substances within three minutes after removal from the vein may be true to a certain extent, and in some cases where transfusion was delayed, the chills and fever seem to have occurred earlier and to have been more severe but in the recent war citrated blood was kept in ice-chests for days and used without any harmful results. Anaphylaxis, agglutinins, and hemolysins, undoubtedly, cause constitutional disturbance in some instances, especially when in emergency cases we use Group 4 donors for patients in any other group.

The technic we use is as simple as possible. The donors are grouped by the Brem method, which test any physician familiar with the microscope should be able to perform. The blood is obtained from the donor through a fifteen gauge or larger needle with a short piece of rubber tubing attached, the blood being collected under constant stirring in a graduate containing 25 c. c. of 2.5 per cent sodium citrate in 0.9 per cent sodium chloride solution for every 250 c. c. of blood. As soon as the desired amount has been obtained, it is, if necessary, filtered through a piece of gauze into a cylinder and injected into the patient. The operator should be on guard for the most common danger signals, namely: generalized pains, dyspnoea, cyanosis, rapid feeble pulse, or loss of sphincter control, and in case any of these signs occur, the operation should be discontinued at once, as wrong grouping, over-filling of the right heart, or embolism may be the causative factor.

Before giving the indications for transfusion, I desire to say a few words about the length of life of a transfused blood cell. Winnifred Ashby, by an ingenious method of injecting blood cells into a patient of different grouping, proved that these cells may live as long as twenty-eight or thirty days. But, naturally,

their length of life will depend entirely upon the amount of blood destruction occurring in a given case, and a certain amount of blood may sustain a patient only five days at one time and three to four weeks at another. While we know that blood does benefit by its sustaining power, we have no conclusive evidence that there is absolutely no stimulative action to the hematopoietic system. The experiments of Carnot and Deflandre proving the presence of a stimulative substance in animals bled twenty-four hours before, have suggested to me the possibility of producing a more pronounced stimulative effect by withdrawing about 300 c. c. of blood on one day and about 500 c. c. on the next day. Whether or not this will be of value I am not prepared to say at this time.

Blood transfusion has been advocated in many diseases with more or less success, and its therapeutic value has been discredited unjustly, because it would not produce results which should never have been expected. We know now that it will do three things:

First: Supply blood actually lost, as in hemorrhage;

Second: Stop hemorrhage in diseases like hemophilia, purpura, and melena neonatorum by supplying both prothrombin and blood platelets;

Third: Raise the blood pressure and keep it up for a longer period than any other therapeutic measure.

We may therefore divide the indications into two groups namely:

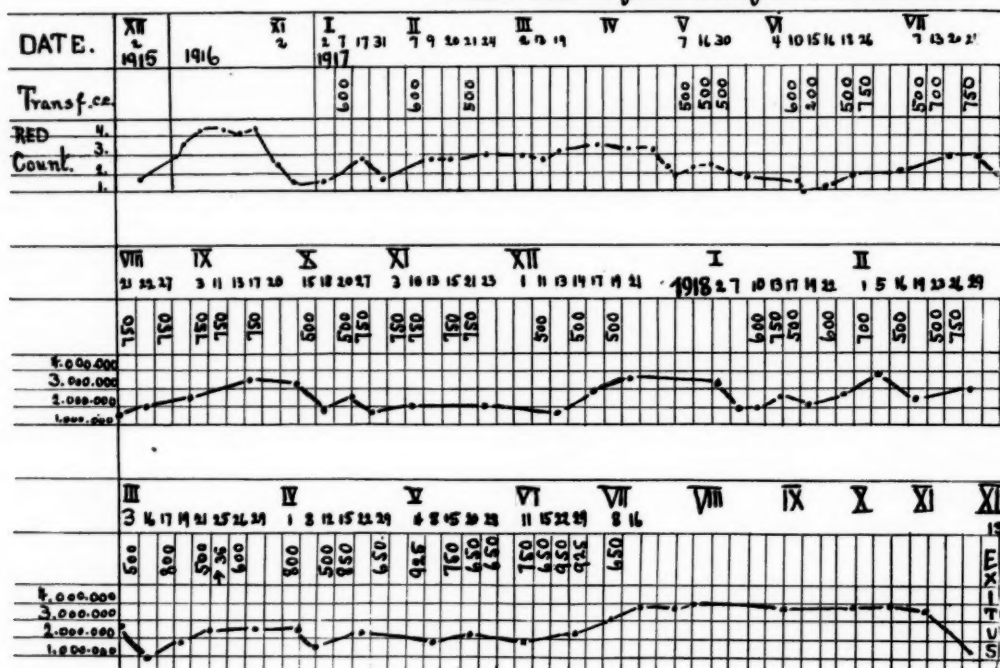
1. Where needed as a specific therapeutic procedure in
  - a. Any severe acute hemorrhage,
  - b. In hemorrhagic diseases;
2. Where needed as a sustaining agent in,
  - a. Pernicious anemia,
  - b. Sub-acute low grade infections,
  - c. Debilitated conditions due to chronic bleeding or constitutional diseases, especially before surgical interference.

That it is a life-saving measure in innumerable cases of hemorrhage has been definitely shown, especially in the recent war. It is a deplorable fact that a considerable number of patients are lost who could have been saved with a small amount of blood before or after the

Mr. J. S. M. Age 60.

Total number of Transfusions: 54.

Total amount of Blood transfused: 34235 cc.



operation. The value in hemorrhagic conditions may be illustrated by the results in a case of purpura hemorrhagica. As the patient had a definite history of tonsillar and tooth infection before the development of the disease, we decided to eradicate all head foci, but her bleeding time was 26 minutes, instead of 1 to 3 minutes normally. Twenty-four hours after the transfusion of 400 c. c. of citrated blood, it had gone to 7 minutes, and her tonsils were removed that day without untoward results, except slight oozing for several days. At the end of five days, the bleeding time was 13 minutes, and after ten days, 17½ minutes. After another transfusion of 400 c. c. the bleeding time returned to 5½ minutes within twenty-four hours, when six badly abscessed teeth were extracted. The patient left the hospital in fine shape two weeks later with a bleeding time of 7 minutes.

Most of my transfusions have been done in cases of pernicious anemia, not as a curative measure, but merely to prevent early muscular

degeneration, to improve the appetite, to stop the nausea and other annoying symptoms, and to keep the patient alive until another remission occurred. To obtain this result, in some cases only one transfusion, and in others as many as forty-nine transfusions were necessary. The case I have charted is of special interest, as the patient received altogether 54 transfusions, 49 of which were necessary to produce the last definite remission, which was of about five months' duration.

That transfusion only indirectly helps to produce remissions seems probable. If we clearly understand what we can expect from this measure it will have a permanent place in the treatment of pernicious anemia until we learn to attack the disease from a different angle, and Cabot's recent prophecy that it will go down as rapidly as the blood count in these cases will not come true.

As you will be able to see from the chart, at certain periods we had to transfuse this patient every five days to keep him alive. He



was often brought to the operating-room in a comatose state, but was revived in a short time by the transfusion of a few hundred cubic centimeters of blood. That these many transfusions did not directly produce the last remission, in July, 1918, but merely kept the patient alive sufficiently long for it to occur, cannot be doubted in this case.

In severe acute streptococcic infections, I have never seen any benefit from transfusion, and advise its use only in low-grade or sub-acute infections, and in toxemias, especially, but not necessarily, when a secondary anemia has developed, and then only as a means of increasing the patient's resistance. With this same object in view, we have used it in cases of severe secondary anemia due to ulcer, carcinoma of the stomach, and uterine fibroids, before or directly after the operation, with most excellent success. Many cases called bad surgical risks on account of the low hemoglobin and low blood pressure were thereby converted into at least fair, or even good, risks.

In conclusion, I wish to bring out and emphasize the following points:

1. That the sodium citrate method is the method of choice, especially since the percentage of reactions has been reduced and their harmlessness been proven.

2. That it is the procedure of choice in hemophilia, purpura, and melena neonatorum.

3. That blood transfusion is far superior to the injection of salt solution, where more than merely a momentary effect is desired.

4. That it will often save a case of acute or chronic bleeding, and permit surgical interference otherwise impossible.

5. That in acute cases of hemorrhage the blood pressure and not the hemoglobin estimation must be our guide to show us when transfusion is indicated.

6. That in cases of severe streptococcic infections transfusion is of no value, but that in low-grade, sub-acute infections, and in toxemias, it will increase the patient's resistance and help toward recovery.

7. That in pernicious anemia in a majority of cases, it will produce **immediate** general improvement and facilitate feeding by increasing the appetite and causing the disappearance of

nausea and other symptoms annoying to the patient, when other therapeutic measures would require weeks to produce the same efforts.

8. That in many cases of pernicious anemia transfusion may cause a remission, but whether by direct stimulation of the bone marrow or indirectly by improving the general condition and circulation has not been decided.

9. That transfusion may have to be repeated again and again to keep the patient alive until another remission occurs.

10. That in pernicious anemia the transfusion of blood has a decidedly beneficial influence, but has no curative value whatsoever.

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#### DISCUSSION

DR. H. Z. GIFFIN, Rochester: Mr. Chairman, Ladies and Gentlemen: Dr. Schaaf has given us an excellent conception of his ideas concerning transfusion and I think they agree almost entirely with our experience at Rochester. It is quite certain that

the mild reactions, that is, chill, nausea, and vomiting, that follow transfusion are not due to agglutination, but to some other factor in the blood of the recipient or donor. The severe reactions that take place on the table can be recognized and the transfusion stopped. In certain cases many transfusions are necessary and the patient is carried along until he has a more or less spontaneous remission, but in the great majority of cases a definite remission begins very quickly after one or two transfusions, so that I believe that in many instances transfusion seems to initiate a remission. I believe there is a tendency to over-transfusion in some cases. Patients who present themselves in very bad condition, semicomatose, and with renal insufficiency, are likely to die rather quickly after transfusion.

The effect of transfusion on purpura is only transient. It is possible with care to operate after transfusion in a great many cases of infectious purpura and get rid of the foci.

One of the things that we see frequently following transfusion in pernicious anemia is the disappearance of nausea and vomiting, and a return of the appetite. I believe that a great deal of the improvement is due to this fact, and that it is largely a matter of nutrition. In certain cases we find it necessary to transfuse in rapid succession, giving several transfusions four and five days apart. Quicker and better results are obtained in that way.

In the acute cases of hemorrhage there is a tendency to wait to see if the blood pressure will drop and the patient will cease bleeding. There is danger, however, in waiting too long.

With respect to the experiments with starvation preceding transfusion, definite conclusions have not been reached.

It might be well to say a word of warning with respect to too great a tendency on the part of some of us to advise transfusion without deliberation. It is such an effective measure that we are apt to do this, especially in cases of secondary anemia but there is always the risk of severe reaction and of introducing a syphilitic infection, and in cases that will improve without transfusion we should not be too hasty in advising it.

DR. A. H. SANFORD, Rochester: Mr. Chairman, Members of the Society: I should like to say a few words in regard to the laboratory work in connection with transfusion. There is a tendency at present to regard this operation as very simple, especially when performed by Lewisohn's method. But, it should not be looked upon as too trivial; there are dangers which must be taken into consideration. The donor must be selected by some method. It matters not whether we employ the method indicated by Dr. Schaaf, which is the one used at Rochester, or some other technic, but some procedure must be employed that will insure perfect compatibility between the donor's corpuscles and the patient's serum. In com-

patibility may not cause death. In weakened persons, however, and those are the ones we are transfusing, death may occur on the table when a donor of the wrong group has been used. A good surgeon will, of course, stop the transfusion if he finds a reaction is occurring after 25 or 30 c. c. of blood have flowed into the patient's veins, but this is a poor method of selecting the donor.

At least five conditions are considered indications for transfusion: First, to restore blood volume after severe hemorrhages; this will not occur very often in civil practice. Second, to replace blood cells; that is, to supply healthy corpuscles to take up the function of those lost in pernicious anemia. Miss Ashbys work has shown the length of time that such transfused blood remains in the recipient. Third, to stimulate the hematopoietic system; it has been thought by many observers that this is one of the secondary effects of transfusion. Fourth, to alter coagulation factors; this can be done in bleeders, or in jaundiced patients so that the coagulation time can be brought down to the normal limit and an operation be performed. Fifth, to transfer antibodies; our own experience has been entirely negative in the attempts to use transfusion in this way, but there have been a few cases reported of the apparent transference of antibodies by this means.

Dr. J. G. Cross, Minneapolis: Mr. Chairman: Some people have stated that they have found it dangerous to transfuse at frequent intervals. I would like to know how you determine the selection of these cases for frequent transfusion. Was it because of lack of improvement immediately after the transfusion, because of some peculiarity in the case, because you were after a quick result, or was it simply experimental? I should also like to know whether in the ordinary run of pernicious anemias, taking that group alone you believe that you get better results by frequent transfusion or as is commonly done by waiting several weeks as is more commonly the practice.

Dr. H. Z. GIFFIN, Rochester (replying to Dr. Cross): Frequent transfusions are used in patients who have a very low blood count. They may be given in rapid succession several days apart and a quick response is usually obtained. Ordinary transfusions are repeated once a week or once in ten days until 4 or 5 have been given. The number of transfusions a patient should have is a question which depends on many circumstances. If improvement is not produced quickly, it is doubtful whether the treatment should be continued.

DR. J. P. SCHNEIDER, Minneapolis: The patient referred to in the paper was a man about six feet two inches tall, with wonderful vitality and wonderful will power. When he was taken with this malady he said "I have every interest in this conflict and I want to live until the war is over." He died two weeks after the armistice was signed and died be-

cause he had no good veins left and there is no question but that he was kept alive by this means. Once his son carried him into the hospital unconscious, and the next day he ate a good meal. As time went on, before the last remission, watching his blood one would say that it was impossible for him to have any remission because the blood was made up of microcytes and macrocytes, apparently formless, and yet he had the remission in which he came down town and became active for five months. When he died he died very rapidly.

One thing this man had which we have not had before but Dr. Giffin reported it in one case. Just as soon as the hemoglobin would go to about twenty-eight, if he would turn in bed or make a sudden exertion on his feet, he would develop a typical angina. He would have to hold himself perfectly rigid and hold his breath and he thought frequently that he was going to die. He used this as the indication that he needed another transfusion. We have not seen that factor in any other case.

Another point which I think we can all derive some benefit from is this; Bernhelm's work in regard to transfusion in emergency is the best book we have. If your patients have had a terrific hemorrhage, and the blood pressure drops to ninety systolic and remains there for several hours, you must transfuse immediately, for even if the patient stops bleeding he will not survive. You cannot wait twelve hours. One young man bled from his esophagus terrifically. In the evening at ten o'clock his systolic blood pressure was 115, although he had bled a great deal. Owing to inability to secure a donor, the transfusion was deferred until morning. Then his blood pressure was ninety-five. He was taken to a hospital and immediately transfused with six hundred c. c. but he did not come back. He was transfused again in the afternoon but it was useless and the patient died.

DR. J. W. ANDREWS, Mankato: Mr. Chairman: Would you not feel safe after a patient had shown three successive negative Wassermann? Would you not then feel that the patient was free from this infection?

DR. C. N. HENSEL, St. Paul: Mr. Chairman: Craig has shown that two ounces of whisky will negate a Wassermann test for twenty-four or forty-eight hours. He has taken syphilitics with a positive Wassermann reaction and given them two ounces of whisky, and after twenty-four hours found a negative Wassermann. This is interesting in connection with the subject we are discussing.

DR. J. G. CROSS, Minneapolis: Mr. Chairman: After taking the most expert advice I can get, I believe the fault is largely in connection with the specimen, or the selection of the time when the blood is taken, and the test should not fall into quite so much disrepute as some of my friends would place it. If you want to be very careful about a donor,

do a provocative Wassermann on him. You may be sure that in about ninety-five per cent of the cases it will show truly whether he has a positive Wassermann or not.

DR. F. SCHAAF, (closing): Mr. Chairman, Members of the Society: I fully agree that blood transfusion should not be over-done. In the Sixteenth Century it was prohibited in France except in the presence of a member of the Academy of Paris. I have been trying to limit the need of transfusion on one hand and on the other hand to emphasize its importance in some instances. I do not believe that we should use it in ordinary secondary anemia, but in conditions where secondary anemia develops, and where the patients were getting weaker and weaker, and did not have enough resistance to overcome the infection, in those cases we have seemed to have very good results. We do not intend to use it as a specific measure, but merely to help other measures for relief.

As to the reliability of the Wassermann, we have been fortunate and never yet have had a case of syphilis develop after transfusion, and in 1,500 cases in the Rochester Clinic, this occurred but twice.

#### CONDITIONS CONTRA-INDICATING OPERATION WITH STONE IN THE KIDNEY AND URETER\*

By W. F. BRAASCH, M. D.,  
Section on Urology, Mayo Clinic  
Rochester, Minn.

Methods of diagnosis and localization of renal stones have been developed to such a degree of accuracy in recent years that the percentage of error has been reduced to a minimum. When the diagnosis is established it is frequently of equal importance to determine the advisability of operation. Several circumstances should be considered before operation is recommended. Among the most important of these are: (1) Duration of symptoms; (2) size; (3) situation; (4) number of stones; (5) certain types of bilateral lithiasis; (6) low renal function; and (7) complications in other organs.

*Duration of symptoms.*—The duration of symptoms should be a considerable factor in determining the advisability of immediate operation. It is not generally realized that probably 75 per cent of renal stones pass spontaneously. The majority of these stones will probably pass within three or four months following the first symptom. It may be stated, therefore, that it is

\*Presented before the Southern Minnesota Medical Association, December, 1919, Mankato.

usually inadvisable to operate for a stone in either the kidney or ureter until at least three months, and possibly six months, have elapsed since the onset of the symptoms. Immediate operation for stone following the first or second attack of pain, without evidence of other complications, is strongly to be condemned. Nature should be given full opportunity to remove the stone without intervention. There may be exceptions to this rule, of course, such as excessive pain continued over a duration of several weeks or months; evidence of acute cortical or perinephritic infection, and evidence of urinary retention sufficient to endanger the kidney. Moreover, when it is evident that the stone is too large to pass, nothing is gained by further delay even though the onset of symptoms is very recent.

*Size of stones.*—When the roentgenogram shows the stone to be less than 2 cm. in diameter, operation should be delayed in the hope of subsequent passage. When the stone is situated in the kidney and is less than 2 cm. in diameter, it may be very difficult to find at operation, and the search may cause considerable destruction of renal tissue. The difficulty of search is increased and consequent destruction of tissue is greater when multiple small stones are present, even though the diagnosis is evident. When the symptoms are indefinite and the identification of the shadow uncertain, immediate operation should not be considered. When the symptoms are not too severe, and there is but little evidence of renal infection, it is advisable to defer operation until the stone has increased in size.

*Situation.*—Stones situated in the renal cortex or in the end of the calyces as a rule cause less damage to the kidney substance, and produce less acute symptoms than stones situated in the pelvis. As a rule the urgency for operation for a stone in this situation is, therefore, not so great. When a stone is situated in the lower ureter, every opportunity should be given for spontaneous passage unless previously mentioned complications are present. Repeated x-rays, taken at intervals, which show a change in position of the stone are indicative of its early passage. When the stone is situated in the bladder portion, the possibility of its passage, naturally, is increased. Rarely is an operation indicated when a small stone is situated so as partially to protrude from the meatus.

*Number of stones.*—When the roentgenogram shows the existence of more than one stone in the kidney or ureter, even though they are of a size which may pass spontaneously, it is usually advisable to operate. Conditions permitting the formation of multiple stones are usually surgical, and the time elapsing before spontaneous passage of such stones may permit of considerable renal damage. If one stone is situated in the ureter and the other in the kidney pelvis, if the stone in the ureter is larger, and efforts to remove it without operation have been unavailing, removal of the ureteral stone is indicated. If the renal stone which remains is less than 2 cm. in diameter, operation should be delayed in order to give the opportunity for the stone to pass spontaneously.

*Bilateral nephrolithiasis.*—In the course of routine examinations stones will be found in both kidneys in approximately every sixth person suffering with renal lithiasis. Although surgical treatment is usually advisable, conditions may be such that any operation for bilateral nephrolithiasis is definitely contra-indicated. When there are no acute symptoms and when the stones in both kidneys are very large and multiple operation is usually inadvisable. Removal of such stones situated in both kidneys is usually accompanied by considerable destruction of the kidney tissue, and the chances are that the patient would live as long and as comfortably without operation. When the symptoms are acute and unilateral, however, operation is of course indicated.

*Renal function.*—Clinical and laboratory evidence of a very low renal function should usually contra-indicate operation when the symptoms are not very acute or persistent. Operation may be justifiable with acute symptoms, however, even though the renal function is far below the normal. It is surprising how well patients with a functional test of less than 20 per cent phenolsulphonephthalein will react following the removal of a renal stone. Furthermore, a renal function test of from 20 to 30 per cent in the presence of lithiasis, particularly when bilateral, will frequently become approximately normal after the stones have been removed. When the phenolsulphonephthalein return is only a trace, however, and the urea retention is high, operation should not



be considered unless the symptoms are urgent. Renal stone occurring with chronic nephritis is observed occasionally. The removal of such a stone will usually not affect the course of the primary nephritis and, unless the surgical indications are urgent, operation is inadvisable. Stone occurring with bilateral pyelonephritis, however, should be removed even though the symptoms are not urgent. Removal of such stones will usually have a favorable effect in that it tends to diminish the infection and further the benefit derived from pelvic lavage. It is advisable to ascertain the function of the opposite kidney before operating for renal stone, since the necessity for nephrectomy may be found on exploration. When the opposite kidney is practically functionless or when it is absent a conservative operation is necessary. Operation for stone in polycystic kidney has been done at the Mayo Clinic in 5 cases. Although operation on a polycystic kidney is usually inadvisable, acute symptoms caused by the secondary formation of stone may necessitate surgical relief. Nephrectomy is indicated only when a complicating infection has rendered the affected kidney functionless. A careful estimate of the comparative renal function is indispensable in cases of polycystic kidney. When glycosuria is present, the same precautions should be observed which are necessary in surgery in any other portion of the body, that is, the reduction of sugar by dietary and other means, and operation only when absolutely necessary.

*Coincident disease.*—Lesions in other organs are frequently noted coincident with renal lithiasis and they may influence the advisability of operation. The presence of a coincident lesion may bring up the question of which lesion should have precedence in treatment. When the several conditions are surgical the lesion which causes the most acute symptoms naturally necessitates operation first. Among the long list of coincident disease, lesions in the alimentary tract and renal lithiasis are the most common. Surgical lesions in the gallbladder, appendix, and duodenum coincident with renal lithiasis occurred in more than 10 per cent of the patients operated on in the Mayo Clinic. The coincident lesion may be such that operation on the kidney should be postponed or even

permanently contra-indicated. Certain forms of cardiac disease, when advanced, may render such an operation inadvisable even though no evidence of decompensation may be present at the time. This is particularly true in the aged. It is not to be inferred, however, that cardiac lesions which are well compensated or of moderate degree will offer any contra-indication to renal operation.

Hypertrophy of the prostate gland coincident with renal lithiasis is occasionally observed. In cases in which most of the symptoms are caused by the prostatic obstruction, prostatectomy is indicated after the usual course of preparation, provided that the other kidney is normal. When the renal symptoms are so acute as to require primary operation the degree of urinary retention is of considerable importance. When a large amount of residual urine is present a preliminary drainage and its usual reaction should precede the renal operation if possible.

Pregnancy, particularly of less than six months, offers no contra-indication to operation. If the symptoms become acute and persistent it may be necessary to operate as an emergency measure even in the later months. As a rule, however, in the latter period of pregnancy it is advisable to defer any operation. Unilateral lithiasis should not cause any serious complication during the course of pregnancy or labor. With bilateral nephrolithiasis, however, renal insufficiency may interfere to such an extent that induced labor may be necessary.

During the years 1917 and 1918, 79 cases were diagnosed renal lithiasis at the clinic in which operation was not advised. In this group the various causes assigned were as follows:

	Cases
Operation deferred because of indefinite diagnosis either from clinical or roentgenographic and cystoscopic data.....	43
Lesion of the central nervous system.....	2
Advanced pregnancy .....	2
Bilateral nephrolithiasis with evidence of uremia .....	3
Hypertrophy of the prostate with renal insufficiency .....	3
Excessive adiposis with indefinite symptoms...	1
Advanced age .....	2
Advanced malignancy in other tissues.....	2

Advanced disease in the other kidney; renal insufficiency .....	1
Advanced bilateral pyelonephritis.....	2
Advanced cardiac disease .....	6
Chronic nephritis .....	2
Hypernephroma of the opposite kidney.....	1
Bilateral nephrolithiasis with pregnancy.....	1
Myocardial disease and goiter.....	1
Active lues .....	2
Advanced diabetes .....	1
Bilateral pyonephrosis .....	1
Single kidney with indefinite shadow.....	1
Active bilateral pulmonary tuberculosis.....	1
Polycystic kidney with renal insufficiency.....	1
Advanced Hodgkin's disease.....	1

From this it may be inferred that the diagnosis of renal stone may be of secondary importance in the clinical summary, and that the conditions which may contra-indicate lithotomy are many.

*Stone in the ureter.*—In recent years numerous articles have appeared with reference to the removal of stones in the lower ureter by nonoperative methods. Some authors in their enthusiasm claim that it is no longer necessary to operate for ureteral stones since they can all be removed by cystoscopic manipulation. In a previous article I reviewed the methods employed to remove stones in the lower ureter and reported 64 cases in which the stone had been successfully removed. Since then we have been able to bring about the passage of stones in 62 more patients, or in 126 in all. It has been our experience that approximately half of the stones in the lower ureter that will not pass spontaneously can be removed successfully by nonoperative measures. This proportion will be greater in larger communities in which the more acute cases with histories of recent symptoms may be observed by the surgeon. In a large number of these early cases small stones would probably have passed spontaneously even though no cystoscopic manipulation had been made. When the stone has been lodged in the lower ureter during a period of more than from three to six months, and when it is more than 2 cm. in diameter, the possibility of its dislodgement by cystoscopic methods is greatly diminished. In justice to the patient, however, an attempt should be made in every case to dislodge the stone before resorting to operation. It is frequently surprising that by simply dislodging a stone which has

been causing symptoms over many months it will be passed by the patient with the next colic. Recent observers have given much importance to the value of drugs which cause the ureter temporarily to relax. It is very questionable, however, what bearing such temporary relaxation could have. Of greater importance is the fact that the stone has been removed from its anchorage by the ureteral catheter, dilating sound, or instrument which has come in contact with it. Definite contra-indication to further attempts to dislodge the stone, however, may be as follows: (1) a stone more than 2 cm. in diameter; (2) acute impaction with continuous obstruction; (3) acute renal infection; (4) intolerance on the part of the patient to the cystoscope, and (5) anatomic deformity.

In conclusion I would emphasize the facts that the great majority of renal and ureteral stones will pass spontaneously, that a large proportion of stones in the lower ureter which do not pass after one or two attacks of colic can be dislodged by cystoscopic manipulation, and that immediate operation for small stones, which have caused recent symptoms, is seldom justifiable.

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Discussion on the paper of Dr. W. F. Braasch

#### DISCUSSION

DR. GILBERT J. THOMAS, Minneapolis: There are just a few points I wish to emphasize in Dr. Braasch's excellent paper.

First, the absence of symptoms with stone in the kidney. I have frequently seen cases of bilateral stones in the kidneys that caused no symptoms. In making a roentgenographic examination for other conditions one frequently finds suspicious shadows which later by cystoscopic methods are found to be stones in the kidney pelvis or within the kidney substance. Such lesions may cause no symptoms. During my service at the Mayo Clinic I observed a case of nontraumatic rupture of the kidney in which the kidney contained a large stone. This lesion was of long duration and the man had had no symptoms.

The reason we so frequently miss the diagnosis of multiple stones in the kidneys and ureters, is because the suspected side only, is rayed and complete Cystoscopic data is not obtained. In my opinion the technique for roentgenography of the urinary tract should always include roentgenograms of both kidneys and ureters together with the bladder.

The second point I wish to emphasize is the contra-indication to operation for small stones in the ureter or kidney. Frequently surgeons have explored for small stones demonstrated in the roentgenogram or by the cystoscope and have been unable to find them at operation, the stones having passed into the



bladder, or if originally lodged in the ureter, they may pass back into the kidney pelvis.

A large proportion of the stones found in the ureter can be removed or, at least, their passage through the ureter and into the bladder can be assisted by the introduction of ureteral catheters or dilators. The introduction of papaverin into the ureter or subcutaneously is of assistance in some cases. Large doses of morphine are not as good as papaverin. In my opinion, surgery should not be attempted until cystoscopic methods have been tried. If one is sure the stone cannot pass or definite damage is being done the kidney surgery should be advised at once.

The third point I wish to call to your attention is the necessity of complete Urologic examination when a lesion is suspected in the urinary tract. The contraindications that Dr. Braasch has told us about were observed only after complete and careful examination.

Very often in making a diagnosis of stone or other lesion in one kidney or ureter, the organs on the other side are not explored by the ureteral catheter and their function is not estimated. This is of course necessary before considering any operation on the urinary tract, as many times one will find a contraindication to surgical intervention which might have been overlooked if a complete examination had not been made.

In many cases of hypertrophy of the prostate the surgeon forgets to cystoscope the case or to make a complete roentgenogram of the kidneys, ureters and bladder. Operation for the removal of the prostate might be contraindicated when complicated by stone in the kidney. Certainly the prognosis in such cases could be more accurately stated if the exact condition of both kidneys is known. The cystoscope will frequently reveal a relaxed bladder outlet in patients that have all the symptoms of hypertrophy of the prostate.

#### THE USE OF THE THOMAS BED KNEE SPLINT FOR THE ROUTINE TREATMENT OF FRACTURE OF THE SHAFT OF THE FEMUR\*

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The Thomas Bed Knee Splint has been used since its invention over fifty years ago for the treatment of fractures of the femur, but it has only been since the Great War brought this splint into prominence that the greater part of the medical profession in the United States has heard of it. Even now it is considered by many as only a first aid or transportation splint and therefore to urge its more common use in fractures of the femur in civil practice seems justifiable at this time. The splint is not used to the best advantage in sub- or trans-trochantric fractures for these, like fractures of the neck

of the femur usually require more or less complete abduction in order to obtain the best results. Of course there are at times certain cases with complications, such as injury and swelling around the groin and perineum, which make necessary some other type of treatment, but it will be found that these are not common if the Thomas splint is understood and its application and adjustment properly performed. To accomplish this however, the underlying principles of the splint must be thoroughly known and rigidly applied.

"Fixed extension" or the use of fixative energy in the treatment of fractures of the long bones has long been a well understood principle, but has probably not been used as often, or by as many men as the principle of "continuous" or "elastic traction" as commonly applied by means of the weight and pulley. With this latter there is a continuous force tending to pull the fragments apart, acting constantly by the application of the force of gravity. There is no fixative force applied except that the same force of gravity results in the patient's body being kept in bed and not pulled onto the floor. This fixative force is not so great but that it is more or less easily overcome by movements of the patient, which movements result in sudden variations in the ratio between it and the constant force applied through the weights. This means that there can be no absolute fixation of a fracture where weight and pulley are alone used and that the variations in tension referred to must cause more pain and discomfort to the patient than would be the case if a definite fixative force were applied.

It is a well known physiological law that nature tends to protect an injured or inflamed area by causing the muscles around or over this area to become hypertonic and thus to act as guards over accidental movement of the parts involved. This is seen, for example, in the rigid abdominal wall of acute peritoneal infections, in the "muscle spasm" of tuberculous or more acutely inflamed joints, and in the rigidity around a fractured bone. This condition is largely reflex and the afferent impulses are due to irritation at the site of the lesion; in fractures movements of the fragments. It can be readily understood from this why it is sometimes necessary to increase

\*Read before the Ramsey County Medical Society, Feb. 1920.

the amount of weight attached to a leg to twenty-five or even more pounds before the muscles finally give up and become relaxed. The reflex arc, or the nerve-muscle system, is stimulated by the movements of the patient and "starting pains" are the result and it is only by this increase in the constant force that the desired results are obtained. Of course even then movements such as are necessary in the nursing of the case, may cause sudden reflex contractions and therefore pain.

Fixative force, in contrast to constant or continuous force, is that which will hold the fragments of a fracture in the same relation to each other at all times regardless of movement of the patient or involved limb. There is no attempt made to keep a constantly extending force on the muscles, but they are merely prevented from contracting after being pulled to the desired length. The use of this fixative force is the underlying principle in bone plating, the so-called external bone plating, plaster of Paris dressings and the Thomas splint. With external bone plates the fixed points are where the pins go through the fragments and these are held stationary in relation to each other by the external clamp. With plaster of Paris the fixed points are the various places on the surface of the body to which the plaster is molded on application, while the constant relationship of parts is assured by the hardness and inelasticity of the plaster. The Thomas splint uses the tuberosity of the ischium as one fixed point and the bottom of the splint as the other, these points being joined by the unyielding side bars of the splint. The traction on the distal fragment is obtained through the skin by means of adhesive plaster or glue and the traction straps are tied down to the end of the splint, which point, as we have just seen, can not slide upward. The force or energy acting at the site of fracture is therefore definitely fixed.

The Thomas splint consists of two lateral bars, made from a single length of heavy iron wire (1 centimeter) bent upon itself in the center, which terminate at the upper end in a well padded ring covered with smooth leather fitting around the thigh, this ring being attached so as to form an angle of 120 to 135 degrees with the inner bar. The ring is the most important fea-

ture of the splint and many failures in the use of the latter are due directly to the former being incorrectly designed. In order to keep the ring constantly against the tuberosity of the ischium and to prevent it from resting on or slipping across the perineum it must be of the right size both as regards circumference and the thickness of the padding. If the circumference is about four centimeters greater than the horizontal circumference of the thigh at the level of the groin it will not constrict the thigh nor irritate the area over the greater trochanter. A ring large enough to allow the fingers to be passed between it and the lateral surface of the hip is satisfactory, but larger rings may need a soft pad placed here to prevent slipping. The ring where it rests on the tuber-ischium and passes around the groin should never exceed three and one-half centimeters in a diameter, as thicker rings cannot be fixed securely. The shape of the ring is also of importance and one should not confuse the bed splint in this particular with the walking splint. The bed splint is symmetrical and can be used for either side while the ring of the walking splint slants posteriorly and curves so as to fit the buttock more accurately and consequently must be made in rights and lefts. The bed splint ring is slightly avoid or egg shaped, the center of the larger or more rounded side being attached to the inner bar. The side bars should be 15-20 cm. longer than the limb.

The application of the splint is simple. The surgeon must also apply, however, his knowledge of physiology and remember that sudden movements at the site of the fracture and also sudden changes in the tension of a muscle, initiate impulses which cause contractions and therefore pain. With this in mind, a gentle but firm traction in the line of the axis of the limb will cause the muscles to relax, at least partially, and allow the splint to be applied without the need of an anesthetic.

After shaving the limb, extension straps of adhesive plaster are applied, or if desired, glue extension with or without preliminary shaving may be used. If adhesive plaster is used, it is applied in the same manner as for a Buck's extension except that the lower ends instead of being attached to a spreader or block of wood are sewn onto webbing straps or loops and left free.

The plaster should run a short distance above the site of fracture if it is not compounded. Spiral adhesive straps may be used for additional security and then the whole limb is wrapped with a roller bandage to hold the adhesive firmly to the skin, but care should be taken to avoid constriction. Of course the straps do not run over the malleoli, but leave the skin two to three centimeters above the ankle, the bandage passing under them here and encircling the ankle a few times.

Glue extension will also be found very satisfactory and is easily applied. There are several types of glue used, Sinclair's and the so-called resin and turpentine glue being the best known. The former consists of equal parts of cabinet-makers' glue and water with the addition of small amounts of glycerine, calcium chloride and thymol, while the latter contains equal amounts of resin, alcohol and benzine with one-thirtieth part of Venice turpentine. Sinclair's glue needs to be liquified in a water bath before use. In order to remove all oil from the skin, sodium bicarbonate solution and ether should be used. The glue, either type is then painted unto the skin with a brush and extension straps of flannel, folded gauze, or unbleached muslin are applied and held in place with a roller bandage, the same precautions being observed as when using adhesive plaster. The straps should be long enough to extend at least one-half a meter below the foot.

The extension straps of whatever variety having been applied, a nurse or assistant exerting traction on the limb while this is being done, the splint is then slipped over the foot and leg until the ring fits snugly against the tuberosity of the ischium, the side bars lying in the same horizontal plane. The extension straps are then passed one over, and the other under their respective side bar, pulled tight, and brought together and tied at the notch in the bottom-cross bar of the splint.

A screw attachment, fastened unto the bottom of the splint, may be used to tighten the straps if desired.

With a recent fracture it is usually possible to pull the limb down to within one or two centimeters of its normal length at this primary application. Frequently the normal length may be obtained.

A long, posterior, gutter shaped splint is then applied to the thigh and leg running to just below the calf. This is well padded so that the normal anterior bowing of the femur is obtained and also slight flexion at the knee joint, as hyperextension is often very painful. This splint is held in position by slings of muslin or flannel running between the side bars of the splint so that the limb is lying in a trough. The slings should be tight enough to keep the side bars running approximately along the midline of the lateral surfaces of the limb. Frequently the posterior splint need not be used, the position of the fragments and the anterior bowing of the femur being retained by the slings themselves. Coaptation splints can now be applied to the anterior surface of the thigh if necessary, and held in place by circular ties of bandages or by ties passing under the side bars and back over the anterior surface. A foot piece should be clamped onto the splints to keep the foot at a right angle and then the entire apparatus from ankle to groin may be wrapped with a muslin or gauze bandage. If care has been taken to see that the ring of the splint is fitting snugly against the tuberosity of the ischium there can now be no motion at the site of fracture.

As a direct result of this the muscles soon become quiescent and relaxed and the patient can move his body or even sit up in bed without altering this condition.

Examination will show that not only the muscles running across the site of fracture are relaxed, but all the muscles of the extremity are flaccid. For this reason it will readily be seen that the use of special positions and apparatus for supracondylar or high shaft fractures is unnecessary as the tendency to deformity disappears when the muscles relax.

A rest to hold the end of the splint off of the bed is used to keep pressure from the patient's heel or the splint may be slung from an overhead frame so as to allow greater freedom of movement in bed.

Within a short time, twelve to eighteen hours, after the primary application of the splint the traction straps will be found to have loosened up due, not to their slipping or stretching, except to a very slight degree, but to the relaxation of the muscles. The slack is

taken up and measurements will show that a gain has been made in the length of the limb. After having done this several times during the first few days one will be surprised to find that the extremity is longer than normal. One to one and one-half centimeters difference in this direction is desirable and when this is obtained the future treatment consists merely in holding it. The tape measure must be used daily as a check and the adjustment of the splint kept perfect. No day should pass without the surgeon satisfying himself that everything is as it should be both as to length and to the position of the fragments, posterior bowing being particularly guarded against.

Patients can be taken easily and without pain to the x-ray room for roentgenographic examination if desired and, unless a metal posterior splint has been used both antero-posterior and lateral views obtained.

This examination is not absolutely necessary, however, for if one has pulled the limb to the required length and has been careful to preserve the normal anterior bowing of the femur there can be no question of malposition as the fragments must be, from the nature of the splint, in correct alignment. This does not mean that perfect end to end approximation of the fragment has been obtained for such accurate anatomical reposition is not necessary if the length and alignment are correct.

Compound fractures are handled in the same way as simple fractures the supporting slings being adjusted so as to allow easy access to the wounds.

In old mal-united fractures with several centimeters shortening it is necessary first to re-fracture, either by open incision or manipulation, but after that the case is treated as outlined above. While the case is still under the anesthetic it is often best, especially if there has been marked shortening to stretch the structures by forcible traction with a block and tackle before applying the splint and in this way save much time in getting the limb to the required length.

The nursing of all cases wearing the Thomas splint is of great importance and nurses should be carefully instructed in their handling. The pressure on the skin over the tuberosity of the ischium can be relieved by changing the posi-

tion of the limb in bed, that is, by abducting or raising or lowering, and the skin surface should be frequently changed by pulling new areas under the ring. Of course it is of primary importance that the skin be kept clean and dry.

The after treatment is not different from that when other methods are used, but one must remember that early weight bearing is to be avoided on account of the yet moldable callus. This is best controlled by use of the caliper splint which is merely a Thomas splint cut off and turned into a socket made in the heel of the shoe. The splint should be about one and one-half centimeters longer than the extremity so that most of the weight will be supported by the splint resting upon the tuberosity of the ischium and not by the recently united femur. The walking ring was designed for this use but the bed splint is absolutely satisfactory when altered for the purpose.

The knee must be bent as soon as it is safe to release the traction straps long enough to allow this motion and if this is done daily during convalescence there is no delay in obtaining the full degree of flexion. Most of the painful and stiffened knee joints resulting from simple fractures of the femur, regardless of the method of treatment which has been followed, are due to prolonged fixation in hyperextension and if care is taken to keep a sufficient amount of padding under the knees to hold them in slight flexion this disabling complication will be prevented in practically all cases.

#### SUMMARY

1. Fixed extension is superior to the weight and pulley in the treatment of fractures of the shaft of the femur.

2. The Thomas Bed Knee Splint is the method of choice for the routine treatment of these fractures.

3. The splint must be of the proper design to be efficient and any alteration or modification detracts from this efficiency.

4. The tape measure must be the criterion as to whether traction has been strong enough.

5. The splint can not work alone. Frequent adjustments and intelligent handling are necessary.

6. The use of the caliper splint during convalescence will prevent late shortening caused by giving of the callus.



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## EDITORIAL

### INFLUENZA IN MINNESOTA

Tables which have been compiled by the Minnesota State Board of Health show deaths by years from influenza as follows, during the past decade:

Year	Deaths
1910	75
1911	151
1912	85
1913	184
1914	122
1915	258
1916	499
1917	257
1918	7,521
1919	2,581
Total	11,733

For the first time an opportunity is given to compare the totals by months. The deaths from influenza for 1917 are given for purposes of comparison.

	1917	1918	1919
January	98	15	1,012
February	56	15	431
March	33	13	609
April	24	55	295
May	16	27	109
June	5	6	38

July	0	4	17
August	0	4	19
September	1	7	14
October	7	2,105	10
November	4	3,260	5
December	13	2,010	22
	257	7,521	2,581

A study of the above table shows many interesting features. During 1919 a slight epidemic of influenza or grippé occurred in April as is evidenced by the 499 deaths from this disease that month, but the number of deaths from influenza each month was greater than the year before. In October the deaths from the great pandemic began and in the last three months of the year totaled 7,375. The situation improved in January of 1919 and throughout the year, with the exception of a slight spurt in March, the deaths from influenza became fewer and fewer until November saw the wave over. The total number of deaths from influenza in the State of Minnesota during the epidemic of 1918-1919, thirteen months of October to October inclusive, was 9,929. Of this number 264 were expected from the average annual mortality from this disease during the previous five years.

It is noticeable in 1918 that as the deaths from influenza increased, the deaths from other causes did not fall off. The expected mortality from all causes for this year was 24,156, the actual mortality 31,380. If the 7,257 unexpected influenza deaths (7,521 less 264) be added to the expected mortality for this year the figure as obtained is almost the same as the actual mortality.

In 1919 the same condition did not prevail, the expected mortality was 24,495 and the actual mortality 24,874. The 2,581 influenza deaths caused a diminution of 1,938 over the expected deaths from other causes. [(24,874—2,581)—(24,495—264)=1,938].

A strange phase little thought of is the birth table:

	1917	1918	1919
January	4,633	4,473	4,171
February	4,374	4,526	4,070
March	5,045	5,290	4,839
April	4,507	4,947	4,596
May	4,402	4,789	4,422
June	4,493	4,626	4,114



July .....	4,905	4,921	4,116
August .....	4,838	4,718	3,903
September .....	4,544	4,717	4,081
October .....	4,450	4,624	4,405
November .....	4,290	4,212	4,334
December .....	4,447	4,030	4,640
	54,928	55,873	51,691

Attention is particularly called to the reduction in the number of births occurring during the epidemic wave. This reduction first began to be felt in December of 1918 and continued until November of 1919, being felt particularly the months of August and September of 1919. There are certain factors which must be considered in any attempt to account for this reduction:

1. A large per cent of the total number of deaths from influenza were among women of childbearing age.

2. The absence of males at war.

3. The high cost of living.

Note that 106,407 white and 511 colored men were sent by Minnesota to war, but that exemption was allowed by draft boards on account of dependency of wife very frequently. The decline of 4,000 births in 1919 over 1918 and the complexity of the situation causing this reduction is entitled to serious study.

C. E. S.

### GENERAL GORGAS

The name of Major General William Crawford Gorgas whose death occurred on July 4th will ever be associated in history with the successful building of the Panama Canal. The triumph of preventive medicine under his jurisdiction, evinced in the control of malaria and the eradication of bubonic plague and particularly yellow fever, was an essential to the completion of the enormous task of building the canal. Where previously one and two out of every three of the inhabitants of the canal zone succumbed to yellow fever, and malaria incapacitated so large a percentage of the workers, his industry and executive ability succeeded in instituting living conditions which compare favorably with those of any health resort.

He was an officer in that branch of the army,

the principal concern of which has come to be the combating of microscopic and ultramicroscopic foes. In a perpetual state of war, bravery, though less dramatic, was an essential and often more praiseworthy. Numerous Americans made their names memorable in the fight against these tropical diseases and the supreme sacrifice was required of such men as Reed, Carroll and Lazear.

It is exceptional for an individual to acquire world fame. The pranks of destiny many times seem to be the controlling factors. Nevertheless, industry and preparedness to step in when opportunity presents itself, are essential requisites and argue against too fatalistic a philosophy of life. In our country too, opportunity more often singles out a man solely on account of his individual merit.

These various factors all played a part in the career of General Gorgas. The son of a Confederate general, the end of the Civil War found him a destitute boy dependent on friends in Baltimore. Immediately after taking his medical degree at Bellevue Medical College in New York, he entered the army and in an early assignment contracted yellow fever. Perhaps this intimate experience with the disease directed his attention to it in his later life.

In 1901 under General Wood he eliminated yellow fever from Havana within the year. His success in this undertaking resulted in his appointment as chief sanitary officer of Panama in 1904 and his supervision of the extensive sanitary operations throughout the canal zone which required primarily administrative ability, medical conviction and attention to detail, miraculously cut down the ravages of disease. His weapons were largely the ash can and wick which continually dripped the larvacide upon the surface of pools and streams. The use of mosquito netting and general sanitary measures completed the trick.

At the request of the British government General Gorgas, in 1911, made an inspection of the Rand mines in South Africa and put his experience at the disposal of that government in combating the high pneumonia prevalence.

As surgeon general of the army from 1914 until his retirement which period included our participation in the World War a record for low disease mortality was attained which had

previously been held by the Japanese in their war with Russia.

Following his retirement from the army, not being content to remain idle, the General personally conducted a sanitation enterprise in Ecuador as a Director of the International Health Board of the Rockefeller Foundation. This was brought to a successful close last October.

It can be said without fear of contradiction that the activities of this man saved the lives of thousands of his fellow beings. He will ever be an inspiration to his brothers in the medical profession.

### MEDICAL MEETINGS

The mid-summer meeting of the Southern Minnesota Medical Association was a success from start to finish. The scientific program was run off in twenty-four hours which afforded no time for delay and the association maintained its reputation for having plenty of snap. A large number of the visiting physicians were cared for by the citizens of Fairmont and cared for in such a way that the paucity of hotel accommodations proved an advantage to the visitors. Much might be said of the poor roads in Minnesota and particularly in the southern part of the state. Inclement weather makes them absolutely unreliable. Railroad accommodations, while more reliable, were most inconvenient. Perhaps these are sufficient reasons for the failure of certain celebrities to make their appearance at the Fairmont meeting. It is quite remarkable that the actual program of any association of physicians bears any resemblance to the one originally planned. The social aspect of the meeting made it possible to derive still greater pleasure from the meeting.

The annual meeting of the Minnesota State Medical Association is scheduled for September 29, 30th and October 1st, 1920, in St. Paul. This is the largest meeting in the State and is the one most generally attended by physicians. This will be an unequalled opportunity for the exchange of ideas and for keeping in touch with the progress of our profession.

### MINNESOTA PUBLIC HEALTH ASSOCIATION COLUMN

By Dr. H. W. Hill, Exec. Sec. M. P. H. A. Shubert Building, St. Paul, Minn.

#### "TRENCH WORK NEXT JANUARY"

What Public Health action is needed in Minnesota from the coming Legislature? Also, and very emphatically, what is NOT needed?

What we need, in all its details, has not yet been fully developed in form for presentation—a State-wide committee is in process of construction with this end in view.

But we already do know at least that Minnesota needs: (a) more Tuberculosis Sanatoria, in counties not yet provided; (b) increase in capacity of the existing Sanatoria; (c) the union of certain counties, now unprovided, with counties already provided. Of these three items we have no doubt. Also we already do know that Minnesota does NOT need any supervision or remodelling of its public health laws by Christian Scientists, who attempt this with the greatest persistence, although without success, last year. We must assume that they will repeat.

An active organization in California is seeking \$25,000—a mere bagatelle for Christian Scientists to spend on their own peculiar religio-medical propaganda—avowedly to restrain development of public health work in the California schools; deliberately to prevent care of tuberculosis and other infectious diseases by modern methods.

In Colorado a similar anti-public health Christian Science movement is already well developed. It is hardly to be expected that energetic Minnesotans of this peculiar brand will allow the tenets of their church to be neglected here. Nor are their efforts directed merely at the fringes of things. During the last regular Minnesota legislative session they introduced a bill doing away with the right of the health officer to make entry and search in case of suspected contagious disease—thus cutting out the very heart of the Health Officer's duties and powers.

The legislative program must be both aggressive and wary—it must seek definitely modern public health goals and at the same time guard against reactionary Bolshevik religio-medical sectarianism. It must be carried on by the Public for it is the Public that need it and are benefited by it.

But the Medical Profession should be posted, should consider and approve or disapprove—and while taking no active part in the legislation, it should watch, ready to support by moral strength and scientific prestige, the efforts of those who will actually "go into the trenches" during the coming campaign.

## REPORTS AND ANNOUNCEMENTS OF SOCIETIES

### MINNESOTA STATE MEDICAL ASSOCIATION

The annual meeting of the Minnesota State Medical Association will be held in St. Paul, Wednesday, Thursday and Friday, September 29th, 30th and October 1st, 1920. Dr. Harry B. Zimmerman, Lowry Bldg., St. Paul, is Secretary of the Surgical Section and Dr. E. L. Gardner, La Salle Bldg., Minneapolis, is Secretary of the Medical Section. Dr. W. W. Lewis, Lowry Bldg., St. Paul, is chairman of the local committee of arrangements appointed by the Ramsey County Medical Society.

### MEDICAL ASSOCIATION OF MONTANA

The Medical Association of Montana held its forty-second annual meeting July 14th and 15th, 1920, in Helena. Following are the officers of the association: Dr. F. M. Larson, Great Falls, President; D. L. Stevens, Laurel, First Vice-President; Dr. P. H. McCarthy, Butte, Second Vice-President; Dr. A. W. Deal, Lewistown, Third Vice-President; Dr. E. G. Balsam, Billings, Secretary-Treasurer.

### WABASHA COUNTY MEDICAL SOCIETY

The fifty-second annual meeting of the Wabasha County Medical Society was held July 8th, 1920, in Zumbro Falls, Minnesota. Papers were read by Drs. Slocumb, Plainview; Dr. H. E. Bowers, Lake City, and Dr. Verne C. Hunt, Rochester. Dr. W. F. Wilson, Lake City, is Secretary of the Society.

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## OBITUARY

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### DR. E. E. WELLS

Dr. E. E. Wells, county physician and poor commissioner of Washington County and one of the leading physicians of Stillwater, Minn., died in May from pneumonia. Dr. Wells was born Dec. 8th, 1870, in Rockford, Ill. He came to Stillwater about twenty-one years ago. He is survived by his widow, two daughters and a sister.

### DR. CARL J. RINGNELL

Dr. Carl J. Ringnell died in Minneapolis, June 9th, at the age of fifty-six years. He was born at Visefjerda, Sweden, June 3, 1864. He came to America when 18 years old and entered Gustavus Adolphus College; after completing his course he entered the University of Minnesota. He was one of the founders of the Swedish Hospital of Minneapolis. He is survived by his widow, one daughter, his aged father and four brothers.

### DR. JOHN WARREN LITTLE

The unexpected death in June of Dr. John Warren Little, of Minneapolis, came as a great shock to his many friends and patients. Born sixty years ago in South Charleston, O., Dr. Little spent the early years of his life there, receiving his preliminary education in its public schools and at Lebanon College.

His medical course was taken at Jefferson Medical College, from which institution he graduated in 1883. Surgical work appealed to him from the first and it was natural that his desire to become a surgeon should have received inspiration from that greatest of surgical teachers of his time, the elder Gross, who was then the professor of surgery at Jefferson.

Coming at once to Minneapolis he entered general practice. Medical cases naturally came first to a young man without hospital or other training in surgery, but he never neglected a surgical opportunity, and the slow rate of his early progress never discouraged him nor abated his enthusiasm in that direction. Early in his career he adopted the practice, common now but much less so then, of making frequent visits to the clinics of noted surgeons, and it always gave him pleasure to acknowledge his indebtedness to these men for any of their methods or points in technic which he afterwards adopted in his own work.

Recognition of his ability brought him positions upon the surgical staffs of the local hospitals and he has served, either in an active or honorary capacity on most of them. For several years he was a member of the University of Minnesota Medical School faculty, teaching clinical surgery.

It was not until fourteen years ago that he announced himself as limiting his practice to general surgery. By this time he had built up a large family practice, and through this had acquired a broad knowledge of general medicine. This, taken with his long training in the school of experience and a natural aptitude for surgical work, combined with a fund of good common sense and judgment, with which nature had generously endowed him, soon placed him in the front rank of his speciality.

His honesty of purpose to do the best thing possible for each patient and to do it well influenced many of the doctors of the Northwest to send him their surgical cases, for they knew they would have no excuses to make for their choice of consultant and operator.

Ten years ago, believing that the welfare of his patients would be materially enhanced by having a place to put them, where the ordinary objections made to hospitals could be eliminated, he, with two or three friends established Hill Crest Hospital.

His hopes in this direction were largely realized and this institution became very dear to him. Many a time the writer has heard him say on his return from a trip or vacation, that he got more real enjoyment out of his work in the wards and operating

room of the hospital than from any vacation he ever took.

The reputation of the hospital he cherished as his own, and he greatly appreciated the efforts of all those who worked for its interests.

Dr. Little was very loyal to his profession and proud to have been a member of it. He gave liberally of his time and money to anything which he felt would advance its interests.

He was a member of all the local medical societies, and has been president of the Minnesota Academy of Medicine, the Hennepin County Medical Society, and the Minnesota State Medical Association. He was also a member of the American Medical Association and a charter member of the American College of Surgeons.

When the war with Germany was declared, it was a great disappointment to him that the age limitation kept him from getting into active service. He immediately joined the volunteer medical service and did his bit in the examination of the drafted men and in services rendered as a member of the state committee of the Council of National Defense.

He had a host of friends and they came from all ranks in life. He was a good mixer and could put himself en rapport with one end of the social scale as well as with the other. He never side-stepped a reasonable request to do a friend a favor; was warm hearted and generous and his charities were not all registered on subscription lists, but were as often individually bestowed from personal knowledge of their need—many a man in Minneapolis has received from him financial aid in time of stress or has secured work through the direct solicitation of the doctor.

He had a deep sense of humor and a large fund of anecdotes and stories making him a delightful companion on a trip or in a leisure hour. Some of his stories told in the Swedish dialect or Irish brogue were inimitable. He was very fond of poetry and the poems of J. Whitcomb Riley were his special favorites. He knew most of them by heart and would quote from them frequently to adorn a tale or illustrate a point.

For a few days before his death, he realized that his sickness might prove fatal, but he continued to fight for life until the end.

This was characteristic of the man never to give up while life lasted.

## NEW AND NON-OFFICIAL REMEDIES

During June the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

### Abbott Laboratories:

**Benzyl Benzoate (Abbott).**

**Elixir Benzyl Benzoate (Abbott).**

### Tablets Benzyl Benzoate (Abbott).

Arlington Chemical Company:

#### Pollen Extracts-Arlco:

<b>Aster</b>	<b>Goldenglow</b>	<b>Popular</b>
<b>Birch</b>	<b>Goldenrod</b>	<b>Poppy</b>
<b>Cherry</b>	<b>Hickory</b>	<b>Red Top</b>
<b>Clover</b>	<b>June Grass</b>	<b>Rose</b>
<b>Corn</b>	<b>Locust</b>	<b>Rye</b>
<b>Dahlia</b>	<b>Maple</b>	<b>Sunflower</b>
<b>Daisy</b>	<b>Narcissus</b>	<b>Timothy</b>
<b>Dandelion</b>	<b>Oak</b>	<b>Walnut</b>
<b>Dock</b>	<b>Orchard Grass</b>	<b>Willow</b>
<b>Elm</b>		

**Ragweed (Ambrosia trifida).**

**Ragweed (Ambrosia artemisiaefolia).**

**Fritzsche Brothers, Inc.:**

**Benzyl Benzoate (Fritzsche).**

**Gilliland Laboratories:**

**Pertussis Bacillus Vaccine.**

**Diphtheria Toxin-Antitoxin Mixture.**

**Heyden Chemical Works:**

**Ichthyat.**

**Hynson, Westcott & Dunning:**

**Whole Ovary-H. W. D.**

**Whole Ovary Tablets-H. W. D. 5 grains.**

**Lederle Antitoxin Laboratories:**

**Antipneumococcus Serum (Polyvalent).**

**Gonococcus Glycerol Vaccine.**

**Pollen Antigen-Lederle (Fall Type).**

**Cellu Flour.**—A specially pure cellulose in the form of flour. It is used as a means of filling out reduced diets, as in the Allen treatment for diabetics. It satisfies hunger without furnishing nourishment. Cellu Flour, after admixture with bran, baking powder, eggs, "India gum," or liquid petrolatum in varying proportions, may be used for the preparation of imitation bread, muffins etc. Dietetic Cellulose Company, Chicago.

**Diaprotein Prepared Casein Flour.**—Casein, to which has been added 4 per cent of a leavening mixture. It is employed in cases, such as diabetes, etc., in which carbohydrates are contraindicated. Diaprotein Prepared Casein Flour is adapted for the preparation of bread cakes, etc. Diaprotein Company, Chicago.

**Anesthesin-Abbott.**—A brand of benzocaine (see New and Nonofficial Remedies, 1920, p. 33) complying with the N. N. R. standards. The Abbott Laboratories, Chicago (Jour. A. M. A., June 5, 1920, p. 1577).

**Pollen Extracts-Arlco.**—Liquids obtained by extracting the proteins from the pollen of various species of plants. For a discussion of the actions, uses and dosage of pollen extracts see New and Nonofficial Remedies, 1920, p. 226. Each of the Arlco products listed below is marketed in sets of four vials representing graduated concentrations: 1:10,000, 1:5,000, 1:1,000 and 1:500, respectively; also in concentrated solution in capillary tubes for diagnostic tests.



For hospital use the diagnostic solution is supplied in 1Cc., 2 Cc. and 3 Cc. containers: Aster Pollen Extract-Arlco, from pollen of *Aster multiflorus*; Birch Pollen Extract-Arlco, from pollen of *Betula populifolia*; Cherry Pollen Extract-Arlco, from pollen of *Prunus* species; Clover Pollen Extract-Arlco, from pollen of *Trifolium* species; Corn Pollen Extract-Arlco, from pollen of *Zea* mais; Dahlia Pollen Extract-Arlco, from pollen of *Dahlia variabilis*; Daisy Pollen Extract-Arlco, from pollen of *Chrysanthemum leucanthemum*; Dandelion Pollen Extract-Arlco, from pollen of *Taraxacum officinale*; Dock Pollen Extract-Arlco, from pollen of *Rumex acetosella*; Elm Pollen Extract-Arlco, from pollen of *Ulmus americana*; Goldenglow Pollen Extract-Arlco, from pollen of *Rudbeckia laciniata*; Goldenrod Pollen Extract-Arlco, from pollen of *Solidago* species; Hickory Pollen Extract-Arlco, from pollen of *Carva alba*; June Grass Pollen Extract-Arlco, from pollen of *Poa pratensis*; Locust Pollen Extract-Arlco, from pollen of *Robinia pseudacacia*; Maple Pollen Extract-Arlco, from pollen of *Acer rubrum*; Narcissus Pollen Extract-Arlco, from pollen of *Narcissus* species; Oak Pollen Extract-Arlco, from pollen of *Quercus* species; Orchard Grass Pollen Extract-Arlco, from pollen of *Dactylis glomerata*; Poplar Pollen Extract-Arlco from pollen of *Populus balsamifera*; Poppy Pollen Extract-Arlco, from pollen of *Papaver somniferum*; Ragweed Pollen Extract-Arlco, from pollen of *Ambrosia trifida*; Ragweed Pollen Extract-Arlco, from pollen of *Ambrosia artemisiaefolia*; Red Top Pollen Extract-Arlco, from pollen of *Agostis alba*; Rose Pollen Extract-Arlco, from pollen of *Rosa rugosa*; Rye Pollen Extract-Arlco, from pollen of *Secale cereale*; Sunflower Pollen Extract-Arlco from pollen of *Helianthus annuus*; Timothy Pollen Extract-Arlco, from pollen of *Phleum pratense*; Walnut Pollen Extract-Arlco from pollen of *Jugland nigra*; Willow Pollen Extract-Arlco, from pollen of *Salix fragilis*.—Arlington Chemical Company, Yonkers, N. Y.

**Antipneumococcus Serum (Polyvalent) Types I, II and III.**—An antipneumococcus serum (see New and Nonofficial Remedies, 1920, p. 269) prepared by immunizing horses with dead and living pneumococci of the three fixed types and standardized against Type I culture. Marketed in double ended vials containing 50 Cc. each, with needle and tubing; also in bottles of 100 Cc. Lederle Antitoxin Laboratories, New York.

**Pertussis Bacillus Vaccine.**—A pertussis bacillus vaccine (see New and Nonofficial Remedies, 1920, p. 285) prepared from several strains of pertussis bacillus (Borget-Gongou). Marketed in packages of four syringes containing 250, 500, 1,000 and 2,000 million killed bacteria, respectively; in packages of four ampules containing 250, 500, 1,000 and 2,000 million killed bacteria, respectively; also in 5, 10 and 20 Cc. vials containing 2,000 million killed bacteria

per cubic centimeter. Gilliland Laboratories, Inc., Ambler, Pa. (Jour. A. M. A., June 26, 1920, p. 1779).

#### PROPAGANDA FOR REFORM

**Chaulmoogra Preparations and Sodium Morrhuate.**—Chaulmoogra oil and preparations made from it are at present extensively employed and seem to produce amelioration in the majority of lepers to whom it has been administered persistently. Investigation has shown that chaulmoogra oil contains bactericidal substances that are one hundred times more active than phenol, and that this bactericidal action is specific for the acid fast group of bacteria to which the causative organism of leprosy belongs. The product is inactive against all other organisms studied. On the other hand it has been shown that sodium morrhuate and the fatty acids of cod liver oil do not have a similar action in tuberculosis which is also due to an acid fast bacterium. The value of chaulmoogra preparations in tuberculosis remains to be demonstrated, and their clinical trial should await their experimental investigation. The indiscriminate use of drugs in tuberculosis may arouse false hopes and may not be without danger to the patient (Jour. A. M. A., June 5, 1920, p. 1578).

**Syrup Leptinol.**—The Council on Pharmacy and Chemistry reports that Syrup Leptinol (formerly called Syrup Balsamea) is inadmissible to New and Nonofficial Remedies, first, because the manufacturer failed to give the profession information either in regard to the amount of the potent ingredient or the method of determining its identity and uniformity; secondly, because of the unwarranted recommendation for its use in such infectious diseases as pneumonia and epidemic influenza and the lack of satisfactory supporting evidence of the alleged therapeutic efficacy in other diseases; and thirdly, because the recommendation for its use appearing on and in the trade package constitutes an indirect advertisement to the public. Syrup Leptinol is marketed by the Balsamea Company of San Francisco. It is a balsamic syrup made from an unclassified species of *Leptotaenia* (a plant belonging to the parsnip family) which grows in Nevada. No evidence was presented to show that it had the remarkable properties ascribed to it by the Balsamea Company. The clinical reports which were reported were little more than chance observations and lacked all control (Jour. A. M. A., June 5, 1920, p. 1590).

**What is the Therapeutic Value of the Hypophosphites?**—A research conducted by the Council on Pharmacy and Chemistry shows: There is no reliable evidence that they exert a physiologic effect. It has not been demonstrated that they influence any pathologic process. They are not foods. If they are of any use, that use has not been discovered. The hypophosphites were introduced into medicine by Churchill, who advanced the theory, long since discarded, that the so-called tuberculosis diathesis



was due to a phosphorus deficiency. It is now known that little phosphorus, if any, is assimilated from hypophosphites—far less than from phosphorus compounds of ordinary foods. As a result of the power of advertising, many physicians still prescribe hypophosphite combinations (*Jour. A. M. A.*, June 12, 1920, p. 1661).

**More Misbranded Nostrums.**—The following "patent" medicines have been the subject of prosecution by the federal authorities, chiefly because the therapeutic claims made for them were false: Seal-leaf Emulsion, an emulsion of cod liver oil and malt extract; Green Mountain Herb Tea, and Sabine's Indian Vegetable Tea, consisting essentially of senna, fennel, elder flowers, anise, triticum, sassafras, American saffron, coriander, licorice root, butternut bark, buckthorn and Epsom salt; Sabine's Indian Vegetable Cough Balsam, consisting essentially of alcohol, chloroform, tar, resin, sugar and traces of alkaloids; Bovinina, apparently a meat extract; alkaloids; Bovinina, apparently a meat extract; Fruit-a-Tives, containing essentially of extracts of aloes, consisting essentially of alcohol, colchicin, ammonium salts, vegetable extractives and water; McDowell Ginseng Bitters, a solution of plant extract, containing small quantities of glycerin and a zinc salt (*Jour. A. M. A.*, June 12, 1920, p. 1661).

**Quality of Acetylsalicylic Acid.**—The following brands of acetylsalicylic acid have been found of satisfactory quality and are in New and Nonofficial Remedies: Acetylsalicylic Acid-Heyden, Acetylsalicylic Acid-M. C. W., Acetylsalicylic Acid-Merck, Acetylsalicylic Acid (Aspirin)-Monsanto, Acetylsalicylic Acid-P. W. R., Acetylsalicylic Acid-Squibb, and Aspirin-L and F. An examination made in the A. M. A. Chemical Laboratory two years ago showed that the product supplied as acetylsalicylic acid was of equal quality with the German made Aspirin Bayer. The Aspirin Bayer now made in America and exploited with misleading claims is controlled by the Sterling Products Company, which sells cascavets, danderine, etc. (*Jour. A. M. A.*, June 12, 1920, p. 1664).

**Formitol Tablets.**—In a report of the Council on Pharmacy and Chemistry, it was stated that Formitol Tablets of the E. L. Patch Company contained formaldehyd (or paraformaldehyd) and some hexamethylenamin, and that the formaldehyd (or paraformaldehyd) had been produced by the decomposition of the hexamethylenamin originally present in the tablets. The Council now reports that the Patch Company declares that no hexamethylenamin is used in the manufacture and that, therefore, that which was found must have been produced from the formaldehyd and ammonium chlorid in the tablets. The Council further reports that a printed sheet received from the Patch Company conveyed the information that Formitol Tablets contained ammonium chlorid, benzoic acid, citric acid, guaiac, hyoscyamus, menthol, paraformaldehyd and tannic acid, but gave

no information as to the amounts of any of the ingredients except that each tablet was declared to represent 10 minims of a 1 per cent formaldehyd solution. Because of the non-quantitative, and, therefore, meaningless "formula", the A. M. A. Chemical Laboratory made an analysis of the tablets. The analysis indicated that the combined weight of all the claimed active ingredients is less than one grain per tablet.

## OF GENERAL INTEREST

Dr. Fred Selle of Tyler will move to Winthrop.

Dr. T. C. Quigley, formerly of Hibbing, has located at Owatonna.

Dr. and Mrs. Carl D. Kolset of Benson have taken a trip to Norway.

Dr. A. Gullixson formerly of Briceyln has opened offices in Albert Lea.

Dr. Paul F. Brown of Minneapolis was recently awarded the Distinguished Service Cross.

Dr. W. R. Humphrey of Stillwater was named country physician to succeed Dr. E. E. Wells.

Dr. Woodward Colby of Minneapolis has become associated with Dr. T. L. Birnberg, Lowry Bldg., St. Paul.

Dr. W. S. Leech of Roseau has sold his practice to Dr. McCoy of Ohio. Dr. Leech will move to Tampa, Fla.

Dr. F. H. Dubbe of Minneapolis has located in New Ulm and has associated himself with Dr. O. C. Strickler.

Dr. F. A. Swartwood has recently been appointed surgeon for the M. & St. L. and C. & N. W. railroads at Waseca.

Drs. E. M. McLaughlin, B. P. Rosenberry and W. W. Nauth have formed a partnership and will practice in Winona.

Dr. George W. Davis of Duluth has retired as an active practitioner after practicing in Duluth for thirty-eight years.

Dr. George Dunn of Elk River has located in Minneapolis. Dr. Dunn is a recent graduate of Johns Hopkins University.

Dr. H. E. Marsh will leave the Mayo Clinic of Rochester to become associated with the Jackson Clinic, Madison, Wis.

Dr. M. Sundt of Hanska has disposed of his practice to Dr. Egbert Borgeson of St. Paul. Dr. Sundt will move to Minneapolis.

At a meeting of the Southwestern Minnesota Medical Society held in Windom, Pipestone was selected for the next meeting place.

Dr. Floyd Woodward of Minneapolis has moved to Jamestown, N. D., where he will have charge of the medical side of the clinic there.

Dr. Edward D. Anderson announces the opening of his offices at 730 La Salle Bldg., Minneapolis, and will specialize in diseases of children.

A location for a physician is offered at Bronson.

Minn. Mr. C. H. Swanson, secretary of the Commercial Club, will furnish any particulars.

A physician is wanted at St. Hilaire, Minn. Particulars may be obtained from Mr. A. P. Wall, cashier, Farmer's State Bank of St. Hilaire.

Dr. Edwin R. Eisler, for the last year interne at the City and County Hospital, St. Paul, has opened offices at 314 Syndicate Bldg., Minneapolis, July 15th.

Dr. J. R. Manley, Duluth, has resigned as medical inspector and will take up post graduate studies in New York. Dr. C. W. Taylor has been appointed to fill the vacancy.

Dr. Carl Cowin of Minneapolis, who has been associated with Dr. Murray has joined the clinic at Jamestown, N. D., where he will specialize in nose and throat work.

Dr. Willard White, who has just completed an internship at the Cook County Hospital at Chicago is associated with Dr. R. E. Farr at 301 Physicians and Surgeons Building, Minneapolis.

The office of the District Supervisor of District No. 10 of the U. S. Public Health Service was moved July 2, 1920 from the Lowry Bldg., St. Paul, to the Keith-Plaza Bldg., Minneapolis.

Dr. Stanley R. Maxeiner of Minneapolis, formerly with Dr. R. E. Farr, will open offices at 1035 Metropolitan Bank Building for the practice of surgery, paying special attention to local anesthesia.

Dr. Louis P. Gross, for the last year interne at the City and County Hospital, St. Paul, after a summer's vacation will start a nine months service at Augustana Hospital, Chicago, under Dr. A. J. Ochsner.

Dr. Arnold P. Gruenhagen, for the last year and a half interne at the City and County Hospital St. Paul, has opened offices at 824 Lowry Bldg., St. Paul. He will be associated with Drs. Comstock and Rutherford.

Dr. Swan Ericson, for the last year interne at the City and County Hospital, St. Paul, will locate at Elmore, Minn., where he will be associated with Dr. H. Blong.

Dr. Frank G. Hendenstrom, for the last year interne at the City and County Hospital, St. Paul, will locate at Braham, Minn. He will be associated with Dr. C. Swenson.

Dr. O. L. Asher member of the medical staff at the State Hospital at St. Peter has resigned and moved to Jacksonville, Ill., where he has accepted a similar position on the staff of the State Hospital at that place.

Dr. Charles E. Hunt of the firm of Drs. Witherstone, Wilson, Hunt, Anderson and Miller of Grand Forks, N. D., has left for a month's post-graduate work in Chicago under Drs. DeLee and Abt in obstetrics and pediatrics.

The Public Health Organizations are employing so many graduate trained nurses that the number available for private cases is becoming more and more limited. Special efforts are being made by various hospitals to increase the size of their undergraduate

classes, many of which begin September 1, 1920. The co-operation of the medical profession in properly directing young women interested in nursing as a profession, is desired.

A June bulletin issued by the Venereal Division of the State Board of Health announces that this Bureau is now in a position to render the services of a physician expertly trained in the diagnosis and treatment of venereal diseases to any region of the state so desiring. This service is for physicians who desire assistance in the preparation and administration of arsphenamine, the taking of blood specimens, examination of smears, etc. We are reminded that the service of the laboratory is free to all patients and all physicians.

Attention is called by the Venereal Division of the Public Health Service at Washington, to the exploitation of various arsenic preparations not related to the arsphenamine group for the treatment of syphilis. This office believes that only preparations of the arsphenamine group should be used for subcutaneous, intramuscular or intravenous medications. The following firms are now licensed to manufacture arsphenamine and neo-arsphenamine: Dermatological Research Laboratories, Philadelphia, Pa.; H. A. Metz Laboratories, New York; Diarsenol Co., Buffalo, N. Y.; Takamine Laboratories, Clifton, N. Y.; Lowy Laboratory, Newark, N. J. If it is desired to use arsenic in other form in experimental work, previous authority from the Bureau should be secured.

The Graduate School of the University of Minnesota will offer a nine months preliminary course of graduate work in ophthalmology and oto-laryngology. The course will consist chiefly of advanced work in the science departments, giving fundamental training essential to this speciality, and will include special anatomy, embryology, and histology of the sense organs and of the head region; physiologic optics; physiology of the special senses and of speech; pathology of the eye, ear, nose and throat; and bacteriology as applied to these organs. A systematic course of instruction, consisting of lectures, demonstrations and quizzes on assigned topics, will be given and will cover the field of ophthalmology and oto-laryngology. Clinical work in the out-patient department, consisting of the taking of case histories, examination and treatment of clinical cases, will be required. The course is not intended to prepare students to enter private practice, but is designed to serve as a basis for further thorough clinical training, such training to be obtained by service as resident in a special hospital, or by acting as assistant in a clinic of recognized standing, or by service in a fellowship under the University of Minnesota Graduate School plan. The course will begin Sept. 29, 1920, and will be limited to ten students, who must be graduates of Class A Medical Schools, and have completed one year internship in an approved general hospital. In-

formation will be sent on request addressed to the Dean of the Graduate School, University of Minnesota.

A fellowship in the Graduate School of the University of Minnesota for research in some problem concerned with the cure of prevention of tuberculosis has been established and will be supported by the Hennepin County Tuberculosis Association of Minneapolis, according to an announcement by Dean E. P. Lyon, of the University Medical School.

The fellowship will yield \$750 the first year and progressively increasing amounts to be appropriated by the tuberculosis association for the second and third years. The candidate for the fellowship must be a graduate of a Class A medical school, according to the terms announced. No teaching or other service will be required of the student. The holder of the fellowship will be expected to devote his time to a study of some phase of the causes, prevention, or cure of tuberculosis.

Every facility of the University will be placed at the disposal of the student, including the splendidly equipped laboratories, the University hospital, clinics and dispensary, and the Mayo clinics at Rochester. In addition, the Twin Cities combined population of 600,000, their thirty hospitals, and the easily accessible tuberculosis sanatoria, four in number, constitute an inviting field for the medical research student who wishes to study the tuberculosis problem from either its clinical or social aspect.

Candidates for the fellowship are directed to write for application blanks to the Dean of the Graduate School, University of Minnesota, Minneapolis, Minn.

## PROGRESS

Abstracts to be submitted to Section Supervisors.

### MEDICINE

#### SUPERVISORS:

F. J. HIRSCHBOECK,  
FIDELITY BLDG., DULUTH.

THOMAS A. PEPPARD  
LA SALLE BLDG., MINNEAPOLIS

#### STUDIES ON EXPERIMENTAL PNEUMONIA— II PATHOLOGY AND PATHOGENESIS OF PNEUMOCOCCUS LOBAR PNEUMONIA IN MONKEYS:

Francis G. Blake and R. L. Cecil (*Jour. Exper. Med.*, April 4, 1920). Autopsies on forty cases of experimentally produced pneumonia in monkeys furnish the material for this second paper. Twenty-seven died either from the disease or from complications. Thirteen were killed at varying intervals.

Experimental pneumonia in monkeys is identical pathologically with lobar pneumonia in man. The pneumococcus invades primarily some points proximal

to the hilum and spreads by way of the perivascular, peribronchial and septal interstitial tissue and lymphatics; quickly reaches the pleura and invades the alveolar structure, by way of the alveolar walls. The initial mode of invasion may be by direct penetration into the walls of the larger bronchi near the hilum. Hepatization begins centrally and spreads toward the periphery and is a constantly progressive process. With the development of hepatization the conspicuous interstitial lesions of the earliest stages, gradually diminish and are often largely marked when complete lobar consolidation has developed. Resolution is frequently accompanied by a varying degree of organization of the grosser framework of the lung. The right and left lobes were about equally affected, but the lower lobes were involved twice as frequently as the upper or middle lobes, in this series.

T. A. PEPPARD.

**PSEUDOCHYLOUS ASCITES IN A CASE OF SYPHILITIC NEPHROSIS:** E. L. Tuohy (*An. Med.*, April, 1920). The author reports a case of typical chronic syphilitic nephrosis with pseudochylous, which is rather infrequently described in the literature. Milky transudates are classified as: (1) The chylous; (2) The chyliform; (3) The pseudochylous. These differ in certain salient features, the chylous form arising from pathological conditions in the lymphatic tract, and showing a high sugar and fat content. The chyliform is described as similar in appearance, containing fat globules in abundance, very likely from disintegration of cellular material. On the other hand, the pseudochylous ascites has the physical properties of the others, but yet is free from the presence of sugar and fat. The milky color in these latter cases is thought to be due to the presence of a pseudo-globulin and lecithin held in solution by the inorganic salts.

The case the author describes is typical of these cases of pseudochylous ascites, which apparently is usually found in the chronic nephroses, particularly of the syphilitic variety, as two-thirds of the cases previously reported bear out. The patient in question had a positive Wassermann, and gave a history of exposure to inclement weather, which caused the exacerbation of symptoms. He complained subjectively of shortness of breath, with swelling of the extremities. Objectively the patient showed the characteristic urinary signs of a chronic nephrosis, in the way of numerous casts, a high albumin content, oliguria, and with an entirely normal blood picture aside from the four plus Wassermann. Blood pressure was normal at all times, with the heart tones good, and the physical examination revealed chiefly the protuberant abdomen containing a large amount of fluid, as well as the edematous tissues generally.

Patient did not respond very materially to treatment, and about 24 hours before his death showed

evidences of an acute peritonitis. Being in extremis operation was inadvisable, and the patient died the following day. The autopsy findings also were quite typical. The abdomen and the pleural cavities contained this pseudochyolous fluid in abundance, the description of which is given in detail and is found to be in accord with previous descriptions. The kidneys showed typical tubular changes, very slight interstitial overgrowth, and the glomeruli seemed to be entirely normal in appearance histologically.

In the conclusion, he summarizes briefly the characteristic features of a chronic nephrosis; namely, the extraordinary number of true casts and high albumin content of the urine, the high blood count, the absence of increased blood pressure, with resultant the absence of cardiac hypertrophy, normal P. S. P. output, no increased N. retention in the blood; a clinical picture of a wet nephritis, pseudochyolous transudates, the positive blood test, and the apparent inflammatory reaction (intra-abdominal) just before death, which is in full accord with Volhard and Fahr's statistics in which they claim that most of these patients die of a pneumococcal peritonitis, for which, however, they do not give any cause.

F. J. HIRSCHBOECK.

#### X-RAY STUDIES OF THE SEMINAL VESICLES AND VASA DEFERENTIA AFTER THE URETHROSCOPIC INJECTION OF THE EJACULATORY DUCTS WITH THORIUM: Hugh H. Young

and Charles A. Waters. (Johns Hopkins Hosp. Bull., Jan., 1920.) Attention is called to the role of the seminal vesicles in the production of any one of the numerous types of arthritis, cardiac and gastro-intestinal disturbances, and neuroses, and the need of a method by which the condition of the canal system above the verumontanum can be graphically depicted without resorting to opening the vas deferentia in the groin as has been done by Malfield, Mills, Thomas and Pancoast and others.

A method is described by which the vesicles can be injected with thorium through the catheterized ejaculatory ducts following endoscopy. By means of a special forked cannula it was found possible to inject both seminal vesicles and both vasa deferentia. By the use of Young's urological table it is possible to take stereoscopic radiographs of the patient while in the position for cystoscopy without disturbing him.

R. G. ALLISON.

#### A STUDY OF THE EFFECT OF PULMONARY TUBERCULOSIS ON VITAL CAPACITY: F. W. Wittich, J. A. Meyers, F. L. Jennings (Sixteenth An. Meet. Nat. Tub. Ass'n.)

Prof. Georges Dreyer of Oxford University lecturing in this country under the direction of the Mayo Foundation stimulated the authors' attention to the importance of the vital capacity measurement as a guide to physical fitness under different conditions and in different classes

of individuals. John Hutchinson as early as 1846 made use of the study of the vital capacity of the lungs as an aid in the diagnosis of pulmonary diseases, demonstrating that cases of pulmonary tuberculosis showed a definite lowered vital capacity. During the recent war the vital capacity measurement was a decisive factor in the selection and rejection of candidates for the British Flying Service.

Dreyer's observations based on his study of 16 men and boys carefully selected on account of their physical fitness and covering as wide a range in weight, height, etc. as possible as well as those of Schuster's extensive measurements of vital capacity on 959 Oxford undergraduates, enabled him "to establish definite relationships between vital capacity and body surface, body weight, stem length and chest measurement" expressed in definite simple formulae. Thus by means of a few fairly accurate standards arrived at so far he studied the effect of pulmonary tuberculosis on the vital capacity of about 150 patients at Brompton Hospital. His results are very promising and to quote Dreyer's own words he has been able, without seeing the patients or knowing anything about the diagnosis, but simply from measurements (recorded and sent to me by Dr. Burrell) of the vital capacity and the various body measurements mentioned above and by subsequent calculation, to classify these persons as normal individuals, or as examples of mild, of moderate, or of severe pulmonary tuberculosis, in practically absolute agreement, as afterward appeared, with the clinical diagnosis and classification made at the time at the Brompton hospital.

The authors' observations consist of the vital capacity together with the other body measurements taken at the same time of about 200 patients, 150 being cases of diseases of the respiratory tract, 100 of whom are definitely classified tuberculous ones. Detailed methods of procedure are given as well as a discussion of the effect of such a test upon tuberculous patients. Tables are presented showing the results as influenced by different stages of the disease. It appears that the careful study of vital capacity in its proper relationship to other body measurements will give important information as to the stage of the disease, the beneficial effects of sanatorium treatment, the progress of the disease, and, when the patient has arrived at the happy termination of his sanatorium treatment, an accurate method of determining his actual physical fitness or limitations.

#### PHYSICAL EXAMINATION VS. THE X-RAY IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS: George W. Norris (Sixteenth An. Meet. Nat. Tub. Ass'n.)

The human senses—sight, touch and hearing—still excel the X-ray in the diagnosis of tuberculosis of the lungs. The X-ray diagnosis of pulmonary diseases has made great strides within the last few years. It has not, however, and probably



will not, displace physical diagnosis. The latter is far superior when it comes to be a question of activity or non-activity of a lesion. Even when X-ray technic is perfect, it requires great expertness to interpret the plates properly. Tuberculosis is not by any means always differentiable from other conditions such as pneumoconiosis by radiographic means. Both methods of examination should be employed.

**SILENCE IN THE TREATMENT OF PULMONARY TUBERCULOSIS:** S. W. Schaefer, (Sixteenth An. Meet. Nat. Tub. Ass'n.) There is a growing realization of the importance of absolute rest in treating patients with active pulmonary lesions. Experimental and clinical data support the employment of rest. In certain cases, however, bed rest does not give sufficient immobilization of the lungs. Patients with the laryngeal lesions when not allowed to talk, frequently show improvement in their lung condition, when before this the pulmonary process had been extending. Some patients even though in bed, exercise their lungs by talking as much as they would if they were up and around. More attention should be paid to the amount of talking in which patients are allowed to indulge. It is not necessary to await the development of a laryngeal involvement before giving them the benefit of silence.

Classes of cases exist in which silence is particularly indicated. Method of using, and case reports were given. The only objection to the use of silence is in its effect on the mental condition. On the other hand the advantage of silence is not solely due to the localized effect on the lungs, but also to the lessening of general bodily fatigue and the absence of mental excitement. The treatment requires the most careful supervision and the encouragement of the patient by the physician. But if the physician has the absolute confidence of the patient, with the judicious use of psychotherapy and the improvement in the patient's condition apparent to him, the mental attitude will improve along with the physical.

**THE DIAGNOSTIC VALUE OF ELECTRO-CARDIOGRAPHY OF HEARTS BEATING REGULARLY:** Paul Dudley White (Med. Clin. No. Am., January, 1920). The electro-cardiogram is useful in the clinical study of cardiac patients who have a regular pulse as well as in cases of arrhythmia. Dr. White takes up in detail these various conditions which with a regular pulse of moderate rate show characteristic electro-cardiograms, considering the auricular, ventricular, and general conditions in order as follows: 1—Auricular hypertrophy in mitral stenosis. 2—Auricular flutter. A case with a regular pulse of 61, and the auricles beating regularly at 244. A 4 to 1 heart block. 3—Ectopic auricular rhythm; case: pulse rate 54. 4—Auriculo, ventricular rhythm; Auricular standstill; and ventricular escape. 5—Auriculo-ventricular heart block: (a) De-

layed auriculo-ventricular conduction. (b) 2 to 1 heart block. (c) Complete block. 6—Intra-ventricular heart block, including right and left and arborization block. 7—Ventricular preponderance. 8—Dextrocardia. 9—Myocardial weakness. 10—Digitalis effect. 11—Hypothyroidism. 12—Tremor.

FRANK W. SPICER.

## SURGERY

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**FOREIGN BODIES OF DENTAL ORIGIN IN A BRONCHUS, PULMONARY COMPLICATIONS:** C. A. Hedblom, (Ann. Surg. May, 1920). It is possible that a large proportion of cases of foreign bodies of dental origin in the bronchi have not been recorded, since of Weist's 1,000 cases 103 only were from the literature; the other 897 were collected by personal communication.

In the past four years at the Mayo Clinic there have been seven cases of pulmonary suppuration following dental operations or trauma. In two cases the tooth was expelled spontaneously; in one it was discharged through a thoractomy wound, and in one it was found at postmortem. In the other cases no foreign body was found. The author reports these seven cases in detail and reviews forty-five proved cases from the literature. In the fifty-two cases the foreign bodies were as follows:

	Cases
Teeth .....	37
Artificial teeth .....	4
Dentures .....	2
Root canal broach .....	2
Dental burr .....	3
Allen's dental cement .....	1
Plaster of Paris .....	1
Hard rubber from gag .....	1
Blade of forceps .....	1

The bodies were most often in the right lower lobe. In twenty-six cases the accident occurred during teeth extraction under general anesthesia. The symptoms are those which are manifest immediately and those from prolonged presence of the foreign body in the bronchus. Coughing is the most common symptom, with the frequently associated symptoms of dyspnea, cyanosis, wheezing respiration, pain in the chest, and nausea. In seven cases there were no symptoms. In thirty-six cases of the series there was evidence of pulmonary suppuration. In the sixteen uncomplicated cases the symptoms were marked in seven and not mentioned in nine. The diagnosis was made by x-ray in five. In four cases the foreign body was expelled spontaneously; in ten broncho-



scopic removal was effected; two patients died following bronchoscopy and thoractomy.

In the thirty-six complicated cases late symptoms developed: Coughing usually with purulent sputum, was present in twenty-nine; hemoptysis in eight, and pain in the chest in eleven. Of sixteen x-ray reports the foreign body was shown in but four, abscess in five, and limitation of movement of the diaphragm by fluoroscopy in one. Five patients were treated by bronchoscopy, three successfully. Fifteen were treated by thoractotomy, and thirteen had the drainage operation for the suppurating process.

Three of the thirteen patients who expelled the foreign body spontaneously, died. Nine of the fifteen patients on whom a thoractomy was performed made a complete recovery; two were greatly improved, and four died. The postmortem findings in the nine fatal cases were empyema, bronchiectasis, abscess, ulcerated bronchus, and gangrene.

In making a diagnosis of foreign body in the bronchus the history of the case is of first importance. A positive diagnosis may be made by means of history, X-ray or bronchoscopy. In early uncomplicated cases bronchoscopy is the best method of diagnosis and removal. If the foreign body is not expelled spontaneously, bronchoscopy is the only method of treatment to be considered in early uncomplicated cases, thoractomy being reserved for cases in which there is suppuration.

V. C. HUNT.

**TUBERCULOSIS OF THE BREAST:** Eugene P. Hamilton, (Surg., Gyn. and Ob., June, 1920). Mrs. S. B., aged 44, whose husband had died of tuberculous laryngitis eight years before, gave a history of the discovery of tuberculosis bacilli in the sputum five years before. These symptoms disappeared after six months of treatment. Three weeks before examination a tumor was noticed in the breast. There was no tenderness nor redness of the skin. A radical amputation of the breast was performed March 30, 1918, and a caseous area was found in its center. A microscopic section showed typical tubercles and giant cells. No tuberculosis bacilli were found in the sputum. In 1829 Sir Astley Cooper reported microscopic features of "scrofulous swelling in the breast", but since then few cases have been reported; to date the literature contains only 180. The condition is classified as (a) primary and (b) secondary, the latter when associated with tuberculosis in some other organ of the body.

The avenue of entrance of the bacilli may be through abrasions of the skin of the nipple, yet it has been shown that tuberculosis may gain entrance through intact skin. In secondary infections of the breast the most frequent foci are found in (1) the lungs and pleura, (2) the cervical and axillary lymph nodes, and (3) the bones. Slight trauma has been noted to be the exciting cause in a large percentage of these cases. The differential diagnosis should be

made from simple pyogenic infection, carcinoma or sarcoma, gumma, and actinomycosis.

Briefly the characteristic symptoms are (1) the rapidity of the disease process, (2) early fistulous formation, (3) the involvement of the lymph nodes, (4) pain when inflammation exists, and (5) the general condition of the patient. The treatment is simple amputation of the breast with removal of the affected glands. In primary cases the prognosis should be favorable in 100 per cent., but in secondary tuberculosis the prognosis depends on the primary focus.

F. R. SANDERSON.

#### SPERMATOCELES AND HYDROCELES CONTAINING SPERMATOZOA:

Randolph Winslow, (Surg., Gyn. and Ob., June, 1920). A spermatocele is a cystic tumor which usually arises from about the juncture of the testicle and epididymis and is generally small, painless, and inverted pear shape. It simulates hydrocele when the cystic mass protrudes into the tunica vaginalis. It occurs usually in men between the age of 20 and 40 and is sometimes seen in older men; more frequently on the right side, but it may be bilateral. The condition is thought to be due to degenerative changes in fetal remains about the testicle, but A. C. Cabot believes the spermatocele is a true retention cyst due to any process which blocks the outlet of the seminiferous tubules. Of the two varieties, the extravaginal and the intravaginal, the former is the most common. It develops when the cyst develops in a direction in which there is no covering of the tunica vaginalis. The diagnosis is made by aspiration or incision, but should be suspected from the location of the cyst between the testicle and the epididymis. When associated with hydrocele the differentiation is difficult and is unimportant.

The occurrence of six cases of hydrocele containing spermatozoa and of one true spermatocele associated with hydrocele under observation has brought up the question how do spermatozoa get into hydroceles? Is the hydrocele due to the presence of spermatozoa, or does the hydrocele, by pressure, cause a communication between the seminiferous tubules and the cavity of the tunica vaginalis? Trauma may produce the latter, but in only one case was there a history of injury. It is probable that in some cases true spermatoceles rupture into hydroceles, thereby permitting the ingress of spermatozoa into the hydrocele. In several cases in which there were two or more sacs it is probable that one of the cysts had ruptured into the hydrocele. The external appearance of the cyst does not differ from the ordinary hydrocele, and the presence of spermatozoa is suspected when a whitish fluid is withdrawn. Possibly by transillumination, light would not show as clearly as when the sac contained straw colored fluid.

The treatment of spermatocele is usually excision, while the treatment of the hydrocele containing sper-

matozoa is similar to that of ordinary hydroceles; namely, excision of the tunica vaginalis, suturing the tunica behind the testicle, or, Andrews' bottle operation.

F. R. SANDERSON.

## GYNECOLOGY AND OBSTETRICS

### SUPERVISORS:

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**MALIGNANT MYOMATA AND RELATED TUMORS OF THE UTERUS:** Newton Evans. (Surg. Gyn. and Ob. Vol. 30. No. 3.) A study of 72 specimens occurring in 4,000 cases of myomata from the Mayo clinic. About 1 in 40 of malignant growths of the uterus is of non-epithelial origin. All spindle cell tumors develop from smooth muscle cells in fibromyomata which to gross appearance are benign, or develop as growths which for a long time cannot be differentiated from benign tumors. There is much variation (as low as 0.4% to as high as 10%) in the frequency of such changes in myomata. There is no definite criterion upon which the diagnosis of malignancy is made. The following characteristics are considered by different authorities: Change in shape and arrangement of the component cells, lack of cell differentiation, variations in the staining properties of the nuclei, presence of "Giant cells," presence of mitotic figures, amount of stroma and character of bloodvessels present. The author classifies his cases on the basis of the number of mitotic figures estimated in a cubic millimeter of tissue. Group (1) 13 cases showing from 1,300 to 22,000 per cubic mm., 11 of whom had died of recurrence in from one to 18 months. Group (2) 11 cases showing from 300 to 2,000 figures per cubic mm., 9 of whom were known to be living and well from 5 months to 13 years later. Group (3) with few or no figures, there was no record of recurrence. He believes that large and atypical mitotic figures are always a sign of marked malignancy. "Giant cells" with atypical nuclei were present in comparatively small numbers in group 1, there were few or none in group 2, but they were frequent in the third group of low or doubtful malignancy. In these there was also a large amount of fibrous stroma with tendency to hyaline formation, and the author assumes that giant cells are not significant of malignancy but rather indicate a tendency to degeneration. Direct cell division with large cells approaching giant cell type is frequent in the less malignant tumors and the author quotes evidence to prove that such cells have lost their power of invasion and malignancy. There is nothing to prove that absence of cell differentiation is an essential evidence of malignancy,

and the only dependable microscopic proof lies in the frequency of mitotic figures found. Accepting this as the standard, the author estimates the frequency of actual malignant degeneration as 0.67%. He believes that actively growing tumors which contain an appreciable number of mitotic figures are in a stage of transition toward malignancy and that many of the others are definitely premalignant.

ARCHIBALD L. McDONALD.

### THE ROLE OF CARBOHYDRATES IN THE TREATMENT OF TOXEMIAS OF EARLY PREGNANCY:

Titus, Hoffman and Givens. (Jour. A. M. A. Vol. 74, No. 12.) In this excellent practical presentation of one theory concerning the etiology and treatment of these toxemias, the authors comment on the difficulty of differentiating between the mild and severe cases, and suggest that much profitable work may be done in the study of the milder ones. It is generally assumed that the vomiting is due to toxic substances elaborated in the maternal metabolism: (1) Autointoxication from the gastrointestinal tract; (2) disturbance in the internal secretions; (3) from the product of conception; (4) abnormal liver function. The authors have developed a systematic dietary based on frequent feeding with an excess of carbohydrates and restriction of meats and proteids. In severe cases they recommend: rest in bed, withhold all food by mouth till vomiting is controlled, gastric lavage, on account of the tendency to reversed peristalsis, magnesium sulphate by stomach tube, enteroclysis with glucose and soda solution, and sedatives (bromides). Afterwards use small amounts of fluids at frequent intervals; whey, peptonized or skim milk, etc., alternated with 2 ounces of 10% glucose with 2% sodium bicarbonate every two hours. Then increase amount and variety but with care. In desperate cases advise glucose and soda (15 to 20 grams of glucose in 250 Cc. of water, sterilized in the autoclave) intravenously. Water is urgently demanded and must be given by rectum or by mouth. They believe that carbohydrate deficiency and starvation is the essential factor, which they substantiate by extensive quotations from the literature and their own observations. They explain an unusual demand on the part of the fetal metabolism for carbohydrates from the mother, and therefore the necessity for increasing that part of the dietary. Failing an adequate supply of glycogen from the diet, the reserve supply in the liver is depleted to a dangerous degree, resulting in fatty degeneration and lowered resistance to certain toxins. They describe the following sequence: hunger due to increased demands, intolerance of the stomach, and a vicious circle with decreased tolerance and starvation, particularly with regards carbohydrates, and toxemia. On the basis of experimental work, the authors have established a normal time curve of the ability of the liver to store as glycogen a known

amount of glucose given intravenously, and estimate the prognosis in a given case depending on the amount of glucose which can be stored in a certain time.

ARCHIBALD L. McDONALD.

**THE TREATMENT OF ECLAMPSIA BY TRANSFUSION OF BLOOD:** W. Blair Bell, (British Medical Journal, May 8, 1920). In 1911 Doid discovered that many viscera contained a toxine, lethal to animals, but wholly neutralized by normal serum. Obata found that the same was true of placental extract in all respects. In eclampsia, however, the blood serum had for some reason or other lost its neutralizing power.

Keeping these experimental discoveries in mind, Bell, confronted by a case of eclampsia which had been reported to him as dying and who had not improved under other treatment, tried the expedient of transfusing 500 cc of citrated venous blood from her husband. The patient's convalescence was uninterrupted and so satisfactory that he would perform blood transfusion immediately in any other case coming under his observation.

ALBERT G. SCHULZE, M. D.

## PEDIATRICS

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**CEREBRAL COMPLICATIONS IN MUMPS:** Horton R. Casparis (Am. Jour. Dis. of Child., Sept. 1919). Involvement of the central nervous system during the course of mumps has been recognized for many years. The occurrence of frank symptoms as a complication of mumps is extremely rare. It seems to vary with different epidemics however. The onset comes more often at the height of mumps. The first symptoms usually are a rise of temperature, headache, and vomiting, but these are not constant. However, one does find headaches, vomiting, drowsiness, rigid neck, or a positive Kernig's sign.

The cerebrospinal fluid findings have been rather constant. The fluid has always been sterile. It is clear and under increased pressure, the test for globulin is usually positive, but not markedly so. It may be negative at first with a high cell count and later on become positive as the cell count decreases. There is no film formation. The cells present are usually lymphocytes and vary from slightly above normal up to one or two thousand. More frequently there are several hundred. The number of cells bears no proportion to the intensity of the symptoms. There is some difference of opinion as to whether or not the increase in cells is present only

in cases where there are frank manifestations of the central nervous system or whether it also occurs in the ordinary cases of mumps. This discrepancy might be explained by different interpretations of the clinical manifestations of the cases studied. It certainly seems probable however, from the findings that involvement of the central nervous system in mumps is much more frequent than most of us have ever suspected.

The diagnosis is not difficult when accompanying the symptoms of central nervous system involvement there is a parotitis and when one finds on lumbar puncture a clear spinal fluid with an increased cell count and without film formation. There are a number of conditions in which one sees similar spinal fluid findings. The more familiar of these being tuberculous meningitis in the spinal fluid of which a film forms, tubercle bacilli may be demonstrated, and the cell count is usually not over 150; poliomyelitis may give the same spinal fluid findings; syphilitic meningitis, the spinal fluid of which gives a positive Wassermann and finally lethargic encephalitis, and lead meningitis, the spinal fluids of which present nothing different from that of mumps meningitis, except that in the former the cell count is usually much lower, from normal to 200.

R. N. ANDREWS.

**CEREBRO-SPINAL INVOLVEMENT IN HEREDITARY SYPHILIS:** Phillip Jeans (Am. Jour. Dis. of Child. Sept., 1919). In this paper it is intended to show that contrary to most current opinions, involvement of the central nervous system in hereditary syphilis is relatively common, and that by statistical study there is no difference in the incidents of central nervous involvements in hereditary and acquired syphilis. Since about one-third of all individuals with acquired syphilis show laboratory evidence of involvement of the central nervous system early in the disease and about the same proportion show more definite evidence of such involvement late in the disease, many syphilographers believe and with justification, that those who show early evidence of central nervous system involvement and perhaps only those are potential candidates for late neurosyphilitic manifestations.

For some time a spinal puncture has been made routinely on all children with syphilis coming to the Washington University Dispensary. It was seen that the nervous system was involved in forty per cent of syphilitic infants. Of those having positive cerebro-spinal fluids slightly more than one-third of the infants and slightly more than two-thirds of the older children had clinical manifestations of neurosyphilis at the time of observation.

Whether syphilis is hereditary or acquired, the earlier it is treated the better the prospect for complete cure. This is just as true for neuro-syphilis as for infection elsewhere in the body. In the great

majority of instances intravenous and intramuscular medication will result in the disappearance of the abnormal findings both in the cerebrospinal fluid and in the blood when such treatment is given early in the disease. Later in the disease these measures are often ineffectual, both clinically and serologically. Even the more drastic procedure of intraspinal therapy, though it may bring about a serologic cure, often leaves the clinical conditions unimproved. Every one realizes how discouraging is the prospect of cure or even of benefit in children showing evidence of parenchymatous and in many instances of late meningovascular involvement of the central nervous system. The time to treat neurosyphilis is before it is clinically manifested. This can be done in at least two-thirds of the instances of such involvements in infancy and in a considerable proportion at any age if we but take the trouble to examine the cerebrospinal fluid in any patient who has syphilis, whether there are any clinical indications for it or not. Justice to our syphilitic patients demands that the condition of the central nervous system, as evidenced by the cerebrospinal fluid, be known before they are discharged as cured.

R. N. ANDREWS.

**THE CHLOROTIC TYPE OF ANEMIA IN INFANTS AND CHILDREN:** Herman Schwarz and Nathan Rosenthal, (*Arch. Ped.*, Jan., 1920) emphasize the frequency of severe anemias in infants and young children. They also show: 1. That a type of anemia corresponding in blood picture, at least, to the chlorosis of adults exists in infants and young children. 2. The administration of iron gives good results. Aside from the recognized anemia producing condition such as rickets, syphilis, tuberculosis, and helminthiasis the authors were able to collect forty cases, in a short time, in which the above causes were not found. Fourteen of these cases were in infants under three months of age. The greatest factors in the etiology were prematurity, twins and a stormy feeding history. The blood picture was one of Chlorosis. The authors carried out iron metabolism experiments which would seem to show a negative iron balance. However the problem is very complex and will require further study. But, as yet empirically, the authors found marked improvement in their cases in which iron was administered and they recommend it in addition to careful control of the diet.

F. C. RODDA.

**HELIO THERAPY; ITS GENERAL USE IN PEDIATRICS:** William Parmer Lucas, (*Arch. Ped.*, April, 1920) notes that the value of heliotherapy has been recognized since ancient times, Herodotus even having outlined the technique. There follows a dissertation on the physics of the sun's rays, the various kinds and actions of each type. All the rays possess the properties of heat, light and chemical action, though quantitatively different—the ultra-violet rays

possessing the greater chemical activity and bactericidal properties.

The physiological action of the sun's rays is not as well understood as the physical. He quotes Rollier's observations, that exposure to the sun produces an increase of hemoglobin, red blood cells and the proportion of eosinophiles. The body temperature and respiratory rate also show changes. Pigmentation of the skin indicates tolerance for the ray. The following conditions are supposed to be benefited by heliotherapy, anemia, tuberculous peritonitis, adenitis, surgical and bone tuberculosis and as a procedure in convalescence. In certain types of pulmonary tuberculosis benefit is to be expected, though in acute forms or those in which hemorrhages prevail, it may do no harm. Sun exposures are not without danger and its employment must be carefully controlled. A detailed discussion of the technique of employing heliotherapy is given with a report of a series of the author's cases in which he found this method of therapy useful.

F. C. RODDA.

## ROENTGENOLOGY

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**RADIUM IN THE TREATMENT OF CARCINOMA OF THE CERVIX AND UTERUS:** Russell H. Boggs. (*Am. Jour. Roent.*, April, 1920.) During the past five or six years the treatment by radium of a large number of cases of carcinoma of the cervix and uterus has yielded results sufficiently good to bring the profession to accept radium not only as a palliative agent, but as a curative measure. The author makes the point that it is just as important to develop a radium technique as a surgical one, and that the best results will come to those who study every detail and check up their results with those of others. He also states that conservative statements on the part of roentgenologists and rather radical methods of treatment are advisable.

Bailey is quoted to the effect that "even the boldest operator can hardly hope to remove all the lymphatic tissues about the base of the bladder, in the parametrium beyond the uterus, or in the base of the utero-sacral ligaments"; and Janeway to the effect that "radium destroys the disease at a greater distance than the knife is capable of removing it" with no risk or inconvenience to the patient. Inasmuch as by any clinical test we are unable to determine extension into the pelvic lymphatic, it is urged that the only safe plan is to ray the pelvic glands in all cases, regardless of the stage of the disease.



After describing the chief characteristics of cancer arising in the fundus and that arising from the cervix, Boggs states that in a large percentage of hysterectomies performed after radium treatment, within 4 to 6 weeks no cancer cells were found in the cervix, but that in some cases there were traces of malignancy in the broad ligaments, and the consideration of the gynecologist is called to this ante-operative procedure even in early cases. When radium is used before operation, the operation should be performed within four to eight weeks before marked fibrous formation has taken place. The surgical results of the Wertheim operation are discussed, and the author voices his belief that proper local radium treatment, with sufficient cross-firing from radium packs or the x-rays from outside as an ante-operative measure, would cure many more cases.

Cancer of the cervix is divided clinically into four groups: (1) Early cases, limited to part of the cervix, with no extension to vaginal walls; (2) more advanced, but clinically still limited to the uterus; (3) with extension to vaginal wall; if there is no glandular involvement a high percentage may be cured by radium treatment; (4) with fixation of uterus, extension to one or both broad ligaments, involvement of vaginal wall and destruction of cervix; in many such cases there is glandular involvement and metastasis. The patients will often derive much benefit from radium, and frequently a local or clinical cure.

Boggs asserts that radium is a specific palliative in operable cancer of the cervix and uterus, that it will cure some cases and give subjective improvement in a number of others; that in many clinically cured cases recurrence will occur within two or three years, the patient meanwhile regaining normal health and leading a useful life; that if recurrence occurs, the patient suffers little in comparison with those who have not had radium, and that the offensive discharge usually disappears within 2 to 4 weeks.

Richey's description of his histological changes following radium is quoted; this and the results of Alter's study of 275 cases of squamous cell carcinoma of the cervix are used to support the author's deduction that operation should be performed 4 to 8 weeks after the radiation rather than immediately afterwards.

In describing his technique Boggs states that he has used radium locally with x-rays or radium externally, giving large doses of radium locally, and with the x-rays, using as many external ports of entry as practicable. The last few years he has been giving 3,000 to 4,000 milligram hours in the vagina, with one and one-half millimetres of brass and sufficient gauze and rubber to provide 15 mm. of filtration. Three tubes were employed, one directed towards the cervix, and one towards each broad ligament. The tubes were packed as far as possible

away from the recto-vaginal wall, to lessen the danger of fistula. Whenever possible, radium was inserted into the cervical canal. The radium tubes in the cervix are filtered by one-half millimetre of silver, one millimetre of brass, and one to two millimetres of rubber. When 6,000 mg. hours are given at one treatment some discomfort may be produced; "but if we are going to treat primary cases without operation, rather heroic measures should be employed."

In discussing the conditions for the production of deep therapeutic effects with hard x-rays and gamma rays, Boggs quotes at length from a paper by Sir Ernest Rutherford on the "Penetrating Power of the X-radiation from a Coolidge Tube (*Philosophical Magazine*, Sept., 1917).

A. U. DESJARDINS.

**MALIGNANT DISEASE OF THE LUNGS, ITS EARLY RECOGNITION AND PROGRESSIVE DEVELOPMENT, AS STUDIED BY THE ROENTGEN RAYS, WITH REMARKS ON TREATMENT:** George E. Pfahler, (*Ann. Surg.*, April, 1920.) The author states that malignant pulmonary conditions, formerly unrecognized before death in a large percentage of cases because of the indefinite symptoms and the general good condition of the patient, cannot be diagnosed in their earliest stages by any means, but hopes that, by intensive study, it may be possible to diagnose the disease much earlier than heretofore. He feels that at present many patients are operated upon at a time when metastasis in lungs and mediastinum is already present. A Roentgen examination should precede all operations for breast carcinoma and, if the findings are doubtful, operate.

Pulmonary malignancy is divided into primary and secondary (metastatic). Primary malignancy is rare and of two types: nodular and infiltrating. In the nodular type, the nodules develop near the roots of the lungs and also in the parenchyma. The nodules vary in size, are sharply defined and irregular in outline. The more common infiltrating type gradually invades the lung from the hilus region. This comes on so gradually and with such indefinite symptoms that the condition is not suspected until one side of the chest is entirely solid, with displacement of the heart and mediastinum to the opposite side, and with early pleural effusion.

The usual symptoms are: Pain, dyspnoea, with or without pleuritic friction, and dullness varying with the degree of involvement. Roentgen examination in the early stages will show a massive opacity about the root of the lung spreading toward the periphery. Sarcoma is especially apt to extend outward along the interlobar septum. In primary carcinoma the infiltrating mass about the root of the lungs spreads usually in an upward direction along the bronchial tree, whereas inflammatory conditions tend to spread downward.



Secondary malignancy is much more common than recognized. Warfield is quoted as having found metastasis in 178 out of 516 necropsies on persons having died of breast cancer. Pfahler thinks that in his studies the proportion would be even higher.

Metastatic sarcoma, more frequent after sarcoma (?) of the testicles, presents nodular, parenchymatous lesions, sharply defined and varying in size from a small pea to a walnut, and rarely larger. None of the patients studied had lung symptoms.

Metastatic carcinoma most frequently follows carcinoma of the breast, and Pfahler advocates a routine Roentgen examination of the chest in breast cancer. Metastatic lesions are of four types: (1) the nodular parenchymatous vary greatly in size; they are not sharply outlined and suggest cotton balls. (2) the infiltrating type, the most common, begins as a general thickening about the hilus resembling inflammatory thickening but with more localized density, and gradually shading outward, with a tendency to extend toward the upper lobe. (3) the military infiltration consists of fine mottling throughout the lungs, the areas being a little larger, more dense and more sharply outlined, than in military tuberculosis. It is doubtful if the diagnosis can be made without careful correlation of the findings with the history. (4) progressive thickening of the pleura with effusion; this is probably a direct extension from the breast. The author discusses statistically the relative frequency of the different malignant types and states that approximately 50 per cent of the cases coming for post-operative roentgentherapy have metastatic chest carcinoma.

Roentgentherapy accomplishes some good, but in most cases, while there is temporary improvement for a period of months or a year, the disease takes on a more rapid form of development with evidence of general carcinomatosis followed by death. Progression of the disease frequently involves the spinal bones and the upper extremities of the humerus and femur.

A. U. DESJARDINS.

#### AN UNCOMMON CASE OF PLEURAL EFFUSION:

Horace J. Howk and John A. Herring. (Am. Rev. Tuberc., Dec. 1919.) Male, age 29, had been under observation since Oct. 1914, with a diagnosis of tuberculosis involving the upper two-thirds of the right lung and the upper one-half of the left lung with manifest thickening of the right pleura at the base with persistent pleuritis which gave no symptoms.

On April 11, 1910 the man became severely prostrated with symptoms of diaphragmatic pleurisy. Fluoroscopic examination showed the right diaphragm to be elevated fully four fingerbreadths above the line of the left diaphragm. The left diaphragm moved up and down readily on respiration, but the right moved only slightly on deep inspiration. Stereoscopic X-ray plates of the chest showed at the

base of the right lung a uniformly dense shadow, the upper border of which extended outward from the spine at the 9th v. s. and when two-thirds of the way to the periphery curved downward to the costal margin. This density appeared continuous with and of the same density as the liver. Its upper surface was smooth and gave the dome-like appearance of the upper surface of the liver. The heart was displaced to the left.

The impression was that something was crowding the diaphragm up from below and the dome-like upper surface of the shadow led them to believe that either the liver or some substance which was projecting upward the upper contour of the liver was responsible for the condition. Comparison with a previous case of known multiple abscess of the liver showed many points of resemblance on the x-ray plates.

The next day a superficial dullness was found extending throughout the right chest from apex to base. Aspiration revealed a clear serous effusion. There had been an extension of effusion throughout the right pleural cavity after rupture of the adhesions confining it to the base. Their theory respecting the definite and confusing limitation of the effusion is that bands of tissue resulting from a prolonged pleuritis held the fluid within strict bounds and that only by coincidence did they take the contour of the upper border of the liver.

R. G. ALLISON.

#### THE RADIOGRAPHIC FINDINGS IN PERICARDITIS WITH EFFUSION:

George W. Holmes. (Am. Jour. Roent., January, 1920.) Attempts from both clinical and experimental studies to solve three problems: (1) Is the shadow of the heart visible within the fluid filled pericardium; (2) what effect does fluid have upon the visibility of the heart beat; (3) what effect has fluid in the pericardial sac upon the shape of the cardiac shadow?

Experiment 1. Visibility of dog heart when immersed in fluids of varying specific gravity. The outline of the heart when suspended in: Air is very sharply defined. Ether is not so distinct but can be readily made out. Water is barely visible. Salt solution, specific gravity 1012-1020, it is impossible to identify the cardiac outline. Salt solution, specific gravity 1036, the heart again is visible but its density is less than the fluid in which it is suspended.

He assumed from the experiment that the specific gravity of the living heart filled with blood is not far outside the range of 1012-1020.

Experiment 2. Injected 150 Cc. of fresh ascitic fluid of specific gravity 1012 into the pericardial sac of a living dog. After the injection the cardiac outline was more rounded, the cardio-hepatic angle was not obliterated, and the heart could not be made out within the shadow of the distended pericardium.

Experiment 3. Injected 200 Cc. of salt solution

specific gravity 1012 into pericardial sac of cases coming to autopsy. Plates made with the subject in prone position showed that the curves at the junction of the heart and the great vessels were straightened out but with no other apparent change in the outline.

Clinical studies: Heart shadows were very much enlarged and there was a definite change in shape with change in position of the patient. Study gives the impression that the absence or presence of pulsation in the individual case depends somewhat upon the amount of fluid present. The greater the amount of fluid the less likely we are to see pulsations. The cardiohepatic angle was sometimes acute, sometimes obtuse, and sometimes obliterated. The angle is more likely to be obliterated if the examination is made with the patient in the upright position. There is an absence of the normal outline of the various chambers of the heart. He was unable to get much data on the effect of the fluid on the triangle back of the heart and in no case was he able to see clearly the diaphragm on the left side.

Summary is made of the findings in pericarditis with effusion and grouped in the order of their importance: (1) An abnormally shaped heart shadow which changes with change of position of patient. (2) Obliteration of the normal heart outline. (3) Change in shape of the angle formed by the posterior border of the heart, the diaphragm, and the spine. (4) Faint or absent pulsations.

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## BOOK REVIEWS

**GERIATRICS.** By M. W. Thewils, M. D. C. V. Mosby Co., St. Louis, 1919, \$3.00.

Senility is a physiologic state like childhood: not a pathologic state of maturity. Diseases in senility are pathologic conditions in a normally degenerating body: not diseases such as occur in maturity complicated by degenerations. With these thoughts in mind the author attacks his problem. He bases his therapy upon them and with the frequent use of illustrative cases succeeds in developing a very readable text. Portions of it contain statements which tax one's credulity, as for example in the treatment of two hundred cases of senile prostatic enlargement the author has never had recourse to catheter life for two weeks and never advised an operation or had a patient who had been operated upon for this condition. Would that we were all so blessed! In the treatment of the above mentioned conditions stress is laid upon the efficiency of chromium sulphate, a drug of very doubtful potency which the texts on therapeutics bearly deign to mention. Aside from the rather startling mixtures which he prescribes in treatment, and the use of many drugs whose therapeutic effect is doubtful, his general directions in the hygienic management of the cases is sound and logical. He approaches the subjects in hand with a proper attention to the pathology of the conditions

existing and his therapeutic efforts are attempts to remedy them. The chapters on senile dementia and the sexual life of the aged are explicit enough to be read by the general practitioner and it will be a distinct relief to the specialist to read a simple exposition of a mental state without having it completely enshrouded and mystified by hypothetical conjectures and pseudo-scientific verbiage.

FRANK W. WHITMORE.

**DIET IN HEALTH AND DISEASE.** By Julius Friedenwald, M. D., Professor of Gastro-Enterology in the University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore; and John Ruhrah, M. D., Professor of Diseases of Children in the University of Maryland and College of Physicians and Surgeons, Baltimore. Fifth edition. Philadelphia and London. W. B. Saunders Company, 1919. \$6.00.

In all its phases this edition rivals with the best books that have been written on any one of the many topics which are here concisely yet comprehensively considered. It may well serve not only as a text book for the general practitioner, hospital interne, and medical student, but it will also fulfill all the needs and requirements of a reference book. Although not voluminous, it has over 900 pages.

A careful and detailed discussion of its merits goes far beyond the scope of this brief review. Special emphasis must be placed on its practical nature. The kinds of foods with their composition, uses and guiding principles both in health and disease have received the most careful deliberation. In compiling this work, the authors having surveyed the literature to the present moment, have incorporated the most recent parts, such as diet lists, recipes, vitamins, and the amino acids, alkali and acid content of the food. Sippy's diet in peptic ulcer is outlined in detail and diabetes, obesity, acidosis, and the deficiency diseases constitute a very prominent part of the work. Dr. Locke's analysis of diabetic foods with other valuable tables too numerous to be mentioned are duly embraced in the volume.

In chapter sequence the book imparts information concerning the chemistry and physiology of digestion, classes of foods, beverages and stimulants, infant feeding, diet for special conditions, special methods of feeding, diet in disease, special diets, dietetic management of surgical cases, army and navy rations, dietaries in public institutions, recipes and chemical composition of American foods. It also contains a rapid reference diet list, sample pamphlet of information for distribution among the poor in summer, weights and measures, and Locke's tables of food values.

It is to be regretted that chapters dealing with the special methods of feeding and diet for special conditions are repeated whole or in part, otherwise, the book in thought and form is most commendable.

J. A. LEPAK.